



Five-Year Review Report

**Third Five-Year Review Report
for the Pristine, Inc. Superfund Site
Reading
Hamilton County, Ohio**


September 2006

PREPARED BY:

**United States Environmental Protection Agency
Region 5
Chicago, Illinois**

Approved by:

Date:


Richard C. Karl, Director
Superfund Division

9/19/06

Table of Contents

<u>Section</u>	<u>Page</u>
List of Acronyms	v
Executive Summary	vii
Five-Year Review Summary Form	viii
I. Introduction	1
II. Site Chronology	2
III. Background	3
Physical Characteristics	3
Land and Resource Use	4
History of Contamination and Initial Response	4
Basis for Taking Action	5
IV. Remedial Actions	5
Institutional Controls	9
V. Progress Since the Last Five-Year Review	12
Protectiveness Statement from the Last Five-Year Review Report	12
Status of Implementing Recommendations from the Last Five-Year Review Report ..	13
VI. Five-Year Review Process	16
Administrative Components	16
Community Notification	16
Document Review	17
Data Review	17
Site Inspection	19
Interviews	20
VII. Technical Assessment	22
Question A: Is the remedy functioning as intended by the decision documents?	22
Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy still valid?	23
Question C: Has any other information come to light that could call into question the protectiveness of the remedy?	24
Technical Assessment Summary	24
VIII. Issues	25

IX. Recommendations and Follow-up Actions 26

X. Protectiveness Statement 27

XI. Next Review 28

Tables

Table 1:	Chronology of Site Events	2
Table 2:	List of Documents Reviewed	Tables Section
Table 3:	VOC Groundwater Cleanup Levels vs. Latest Sampling Results	Tables Section
Table 4:	SVOCs/Pesticides/PCBs/Metals Groundwater Cleanup Levels vs. Latest Sampling Results	Tables Section
Table 5:	Pounds of VOCs Removed per Year	Tables Section
Table 6:	Soil Vapor Levels Over Time for Probes with Recent Action Level Exceedances	Tables Section
Table 7:	List of Primary ARARs and TBCs	Tables Section
Table 8:	Issues	25
Table 9:	Recommendations and Follow-up Actions	26

Attachments

Attachment 1: Deed Notice titled “Deed Restriction” for the Pristine, Inc. Superfund Site

Attachment 2: Newspaper Ad Announcing the Pristine, Inc. Superfund Site Five-Year Review

Figures

Figure 1:	Pristine, Inc. Site Location in Relation to the Cincinnati, Ohio Area
Figure 2:	Pristine, Inc. Site Location in Relation to Nearby Facilities
Figure 3:	Pristine, Inc. Site Map Showing Zone A and Zone B
Figure 4:	Extent of 1,2-DCA Groundwater Plume from 1999 to 2005
Figure 5:	1,2-DCA Lower Aquifer Sampling Results Over Time for Selected Wells
Figure 6:	TCE Lower Aquifer Sampling Results Over Time for Selected Wells
Figure 7:	Potentiometric Surface Map Before March 2002 Pumping Rate Reduction
Figure 8:	Potentiometric Surface Map After March 2002 Pumping Rate Reduction
Figure 9:	Potentiometric Surface Map Before March 2006 Pumping Rate Reduction
Figure 10:	Potentiometric Surface Map After March 2006 Pumping Rate Reduction

List of Acronyms

1,2-DCA	1,2-Dichloroethane
1,2-DCE	1,2-Dichloroethylene
ARAR	Applicable or Relevant and Appropriate Requirement
CD	Consent Decree
CDS	Cincinnati Drum Services
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
COC	Contaminant of Concern
CRA	Conestoga-Rovers & Associates
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
FOIA	Freedom of Information Act
G.E.	The General Electric Company
GPM	Gallons Per Minute
IC	Institutional Control
ISVE	In-situ Vapor Extraction
MSDGC	Metropolitan Sewer District of Greater Cincinnati
NCP	National Contingency Plan
NPDES	National Pollution Discharge Elimination System
NPL	National Priorities List
OAC	Ohio Administrative Code
Ohio EPA	Ohio Environmental Protection Agency

List of Acronyms, cont.

O&M	Operation and Maintenance
ORC	Ohio Revised Code
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PCOR	Preliminary Close-Out Report
PHHRA	Preliminary Human Health Risk Assessment
PRP	Potentially Responsible Party
RA	Remedial Action
RAO	Remedial Action Objective
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI/FS	Remedial Investigation and Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SVOC	Semi-volatile Organic Compound
TCE	Trichloroethylene
UECA	Uniform Environmental Covenant Act
U.S. EPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UU/UE	Unlimited Use or Unrestricted Exposure
VOC	Volatile Organic Compound
WPTD	Waste, Pesticides, and Toxics Division

Executive Summary

The remedy for the Pristine, Inc. Superfund Site in Reading, Ohio includes demolition of Site structures, thermal treatment of soil, construction of a soil cap, installation and operation of a groundwater pump-and-treat system, installation and operation of an in-situ soil vapor extraction (ISVE) system, groundwater and soil vapor monitoring, and institutional controls. The Site achieved construction completion with the signing of the Preliminary Close Out Report (PCOR) on September 30, 1998. The trigger for this Five-Year Review is the issuance date of the last Five-Year Review Report of September 28, 2001.

The assessment of this Five-Year Review found that the remedy was constructed in accordance with the requirements of the Record of Decision (ROD), ROD Amendment, and Explanation of Significant Differences (ESD). The groundwater pump-and-treat system and the in-situ soil vapor extraction system are functioning as designed. The immediate threats at the Site have been addressed, and the remedy is protective of human health and the environment in the short term. Long-term protectiveness will be verified based on the follow-up actions and recommendations in this report. The remedy will be confirmed as fully protective when groundwater and soil cleanup goals are achieved, and when the institutional control recommendations are implemented.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name (<i>from WasteLAN</i>): Pristine, Inc. Superfund Site		
EPA ID (<i>from WasteLAN</i>): OHD076773712		
Region: 5	State: OH	City/County: Reading/Hamilton County
SITE STATUS		
NPL status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input checked="" type="checkbox"/> Operating <input type="checkbox"/> Complete		
Multiple Operable Units (OU)? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Construction completion date: September 30, 1998	
Has site been put into reuse? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
REVIEW STATUS		
Lead agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency		
Author name: Ronald W. Murawski		
Author title: Remedial Project Manager	Author affiliation: U.S. EPA Region 5	
Review period: April to September 2006		
Date of site inspection: June 1, 2006		
Type of review: <div style="margin-left: 100px;"> <input checked="" type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion) </div>		
Review number: <input type="checkbox"/> 1 (first) <input type="checkbox"/> 2 (second) <input checked="" type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify)		
Triggering action: <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Actual RA On-site Construction at OU # ____ <input type="checkbox"/> Construction Completion <input type="checkbox"/> Other (specify) </div> <div> <input type="checkbox"/> Actual RA Start at OU# <u>NA</u> <input checked="" type="checkbox"/> Previous Five-Year Review Report </div> </div>		
Triggering action date (<i>from WasteLAN</i>): September 28, 2001		
Due date (<i>five years after triggering action date</i>): September 28, 2006		

Five-Year Review Summary Form, cont'd.

Issues

1. Cleanup levels for Site contaminants do not reflect current risk assessment practice and current toxicology. The groundwater and soil cleanup levels in the ROD do not reflect the effects of cumulative risk in all cases. The groundwater cleanup level for pentachlorophenol does not consider that this contaminant is now classified as a carcinogen. There is no soil cleanup level for vinyl chloride. The soil cleanup level for chloroform did not consider the inhalation pathway. The groundwater cleanup levels for arsenic and beryllium are based on surface water standards, not background levels or drinking water standards.
2. Institutional Controls (IC) were implemented at the Site but need to be supplemented with: 1) an environmental covenant that “runs with the land” pursuant to the Uniform Environmental Covenant Act (UECA); 2) maps (paper and electronic versions) of all areas that require land and groundwater use restrictions; 3) evaluation of the adequacy of governmental controls; and 4) revision to the O&M Plan to include mechanisms to ensure regular inspection of ICs at the Site, annual certification, and a communications plan.

Recommendations and Follow-up Actions

1. Cleanup levels in the ROD for Site contaminants that reflect current risk assessment practice and current toxicology should be evaluated. Conclusions in the Preliminary Human Health Risk Assessment should be considered to determine their effect on current soil cleanup levels. If groundwater and soil cleanup levels are developed that appreciably affect the extent of cleanup at the Site, a ROD Amendment or Explanation of Significant Differences may be necessary.
2. U.S. EPA will prepare an IC Plan within six months of the issuance of this Five-Year Review Report to supplement the ICs as noted in the “Issues” section above.

Other Ongoing Operation and Maintenance Issues

1. The effect of the recently approved, groundwater pumping rate reduction is unknown. It is also unknown if or when the original pumping rate associated with the 450 gpm system will be re-established.
2. There needs to be better communication between the parties involved with the Pristine, Inc. Site and those involved with the G.E. Site, so that the Pristine, Inc. parties are more aware of G.E.’s efforts to remediate its VOC groundwater plume.
3. U.S. EPA and Ohio EPA should have a better idea of the extent of off-site groundwater contamination encroaching onto the zone of influence of the Pristine lower aquifer extraction system.

4. After the ISVE system is shut down, soil samples should be taken and analyzed, in order to confirm the estimated soil concentrations in the Preliminary Human Health Risk Assessment. Once this confirmation occurs, the final Human Health Risk Assessment should be issued.

Other Ongoing Operation and Maintenance Recommendations

1. U.S. EPA, Ohio EPA, and the Pristine Trust should monitor the effect of the reduced groundwater pumping rate on expeditiously achieving groundwater cleanup goals.
2. The Superfund Division should continue to work together with the Waste, Pesticides, and Toxics Division (WPTD) and Ohio EPA to review information on the progress of remediating the G.E. VOC groundwater plume. U.S. EPA and Ohio EPA, through its oversight efforts, should ensure that G.E. expeditiously progresses toward remediating its plume. U.S. EPA should continue to share information with the Pristine Trust on the subject.
3. U.S. EPA and Ohio EPA should study groundwater monitoring results more closely from CRA wells to the west and south of the Site, to better determine to what extent off-site contamination is encroaching onto the zone of influence of the Pristine lower aquifer extraction system.
4. U.S. EPA should approve the Final Human Health Risk Assessment after confirmatory soil sampling results are provided by CRA.

Protectiveness Statement:

The remedy is currently protective of human health and the environment. All immediate threats at the Site have been addressed; there is no evidence of exposure to Site-related contaminants; and the existing Site and groundwater uses are consistent with the objectives in the remedy and deed notice. Long-term protectiveness requires groundwater and soil cleanup goals to be achieved, continued operation of the remedy, compliance with use restrictions described in the deed notice, and implementation of additional ICs that “run with the land” along with additional assurances that ICs are monitored.

Other Comments:

None.

**PRISTINE, INC. SUPERFUND SITE
READING, OHIO
FIVE-YEAR REVIEW REPORT**

I. INTRODUCTION

The purpose of the Five-Year Review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify issues found during the review, if any, and identify recommendations to address them.

The United States Environmental Protection Agency (U.S. EPA) prepared this Five-Year Review Report pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA §121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

U.S. EPA interpreted this requirement further in the NCP. 40 CFR §300.430(f)(4)(ii) states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

U.S. EPA Region 5 conducted the Five-Year Review of the remedy implemented at the Pristine, Inc. Superfund Site in Reading, Ohio. This review was conducted for the entire Site from April to September 2006 by a review team headed by U.S. EPA, and included Ohio EPA and the United States Geological Survey (USGS). This report documents the results of the review.

This is the third Five-Year Review for the Pristine, Inc. Superfund Site. The triggering action for this statutory review is the issuance date of the last Five-Year Review Report of September 28, 2001, as shown in U.S. EPA's WasteLAN database. This Five-Year Review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure.

II. SITE CHRONOLOGY

Table 1: Chronology of Site Events

<i>EVENT</i>	<i>DATE</i>
Site used for sulfuric acid and fertilizer manufacturing	before 1974
Site used for liquid waste disposal	1974-1981
Permit obtained to operate a liquid waste incinerator	1977
Site accepts bulk and drummed waste	1977-1981
Drummed waste removed under a Consent Decree between Ohio EPA and Pristine, Inc.	1980-1983
Site closed due to permit violations	1981
U.S. EPA proposes Site for National Priorities List (NPL)	12/30/1982
Final Listing on U.S. EPA NPL	09/08/1983
Sludges and contaminated soils removed under an Administrative Order on Consent between U.S. EPA and PRPs	1984
U.S. EPA conducts the RI/FS	September 1984- December 1987
Record of Decision (ROD)	December 1987
ROD Amendment to change treatment of on-site soils from in-situ vitrification to thermal incineration and in-situ vapor extraction (ISVE)	March 1990
RD/RA Consent Decree issued by U.S. EPA	September 1990
Site structures demolished	January 1992
ESD to change soil treatment from incineration to thermal desorption and to revise cleanup levels for PAHs in soils	July 1993
Treatment of soil by thermal desorption	1993-1994
Reading, Ohio well field closed as a result of Ohio EPA administrative proceedings that documented groundwater contamination	March 1994
Construction of the ISVE system and construction of the soil cap over Zone A	September 1994- August 1996
ESD to waive Ohio EPA anti-degradation rule from applying to discharge limits from the treatment plant to Mill Creek	April 1996

<i>EVENT</i>	<i>DATE</i>
U.S. EPA issues first Five-Year Review Report	May 1997
ISVE system start-up	October 1997
Start-up of the 150 gpm groundwater pump-and-treat system	October 1997
U.S. EPA issues Preliminary Close-Out Report documenting construction completion	September 30, 1998
Start-up of the 300 gpm groundwater pump-and-treat system	October 1998
New standards for the pump-and-treat system effluent into Mill Creek take effect	October 2000
U.S. EPA issues Interim Five-Year Review Report	September 2001
U.S. EPA approves a reduction in the groundwater pumping rate from 450 gpm to 375 gpm*	March 2002
U.S. EPA approves the Preliminary Human Health Risk Assessment	January 2006
U.S. EPA approves a second reduction in the groundwater pumping rate from 375 gpm to 150 gpm*	March 2006

* These values refer to design flow rates for the combined 150 gpm and 300 gpm treatment systems. The average flow rates for the water pumped from the lower aquifer are less than the design values. The pumping rate reductions were preceded by Force Majeure notifications from CRA to U.S. EPA dated April 2, 2002 and March 16, 2005.

III. BACKGROUND

Physical Characteristics

The Pristine, Inc. Site occupies approximately three acres and is located in an industrial area within the City of Reading, Ohio in Hamilton County. See Figure 1. The Site is underlain by the Mill Creek bedrock valley. Mill Creek eventually empties into the Ohio River. The lower outwash aquifer above this bedrock valley was formerly the primary source of water supply for the area, including the water supply for the City of Reading. The supply wells were formerly located in three areas: 1) north of the CDS facility and east of Mill Creek (about 400 feet northwest of the Pristine, Inc. Site); 2) south of the G.E. facility, on the west side of Mill Creek; and 3) in the north end of Koenig Park, located south of the Pristine, Inc. Site, CDS, Rohm and Haas, and G.E. There is a separate upper aquifer in some parts of the bedrock valley, but below the Site, groundwater is present only in a number of interconnected lenses above the lower outwash aquifer. Mill Creek flows from north to south approximately 600 feet west of the Site. Mill Creek is not used for drinking or recreation other than for occasional fishing.

Land and Resource Use

The Site is zoned as heavy industry. Immediately west of the Site and between the Site and Mill Creek is Cincinnati Drum Services (CDS), a drum recycler. See Figure 2. The CDS owners own the 13-acre parcel that includes the Pristine, Inc. Site. The land to the north of the Site is owned by the City of Reading and occupied by the Metropolitan Sewer District of Greater Cincinnati (MSDGC). MSDGC is constructing a sewage holding and treatment facility on this property, which is scheduled for startup in 2006. The Rohm and Haas Site is south of the Pristine, Inc. Site and is subject to a corrective action agreement under the U.S. EPA RCRA program. The Rohm and Haas Site manufactures synthetic stabilizers and plasticizers. Railroad tracks owned by the Southwest Ohio Regional Transit Authority are to the east of the Site. A grain elevator is located east of the railroad tracks. Other industrial facilities are active in Mill Creek Valley, including a General Electric (G.E.) aircraft engine facility west of Mill Creek. G.E. is another site subject to a corrective action agreement under the U.S. EPA RCRA program. There are no residences near the Pristine, Inc. Site.

The current ICs in the form of a deed notice advise that the Site should not be used for residential or commercial purposes. They also caution against use of water from the lower aquifer or any construction, installation, or removal activities except for those uses that may be required to implement the remedy. The deed notice has been recorded with the local Recorder's Office.

History of Contamination and Initial Response

The Site was used as a liquid waste disposal facility from 1974 to 1981. Prior to 1974, the Site had been used for the manufacturing of sulfuric acid and fertilizer. In 1977, Pristine, Inc. obtained a permit to incinerate liquid waste on-site and accepted both bulk and drummed waste for incineration. The Site was closed in 1981 due to numerous permit violations and, at the time of closure, more than 10,000 drums and several hundred thousand gallons of bulk liquids were on-site. The chemicals of concern have included the following:

- Polychlorinated biphenyls (PCBs);
- Pesticides such as DDT, aldrin and dieldrin;
- Volatile Organic Compounds (VOC) such as 1,2-dichloroethane, methylene chloride, chloroform, benzene, vinyl chloride, tetrachloroethene and trichloroethene;
- Semi-volatile organic compounds (SVOC) such as polycyclic aromatic hydrocarbons (PAH), phenol and bis(2-ethylhexyl)phthalate;
- Metals such as cadmium, lead and mercury; and
- 2,3,7,8-tetrachlorodibenzodioxin (TCDD) in the Pristine incinerator ash.

From 1980 to 1983, most of the drummed material was removed under a CD between Ohio EPA and Pristine, Inc. In September 1983, the Pristine, Inc. Site was formally added to the National Priorities List. In 1984, sludges and highly contaminated soils were removed from the Site under an Administrative Order on Consent between U.S. EPA and a group of private parties. The

removal actions taken from 1980 through 1984 addressed the immediately hazardous Site conditions but did not address the long-term risks associated with contamination in the subsurface soils or groundwater.

Basis for Taking Action

In 1984, U.S. EPA initiated a Remedial Investigation and Feasibility Study (RI/FS) to define the extent and magnitude of the remaining contamination at the Site, to characterize threats to human health and the environment and to evaluate remedial alternatives. The RI included sampling of surface and subsurface soils, incinerator residues, sediments, surface water, and groundwater. The sampling results showed that the subsurface soils and Site groundwater were highly contaminated. The RI/FS demonstrated that the potential human health risk from contact with contaminated soils and groundwater was unacceptable. In addition, the potential for migration of groundwater contamination from the Site presented an unacceptable, potential risk of contamination to the City of Reading water supply.

On December 31, 1987, U.S. EPA issued a Record of Decision (ROD) that addressed contaminated soil and groundwater. The selected remedy consisted of the following components:

- Excavation and on-site consolidation of 1,725 cubic yards of sediment and soil;
- In-situ vitrification of contaminated soil to an average depth of ten feet across the Site;
- Installation of a french drain along the eastern Site boundary;
- Extraction of groundwater from the lower outwash lens/lower aquifer using at least one extraction well;
- On-site treatment of groundwater using an air stripper with discharge to Mill Creek;
- Demolition, decontamination and removal of all on-site structures; and
- Access and deed restrictions, and groundwater monitoring.

IV. REMEDIAL ACTIONS

In November 1987, more than 130 parties were notified of their liability at the Pristine, Inc. Site and invited to negotiate with U.S. EPA for the design and construction of the final remedy. Negotiations with the parties ended on March 29, 1988, without an agreement. On March 31, 1988, a group of private parties proposed to use in-situ soil vapor extraction (ISVE) instead of in-situ vitrification, claiming equivalent performance. U.S. EPA reviewed the proposal and determined that ISVE would treat the VOCs but not the pesticides and PAHs in the soil. U.S. EPA agreed to reopen negotiations if the parties included thermal treatment (incineration) with ISVE to treat the soil and maintain the groundwater pump and treatment system as described in the December 1987 ROD, using the same cleanup standards. The negotiations were reopened and an agreement reached, which is documented in a CD signed by 111 parties and U.S. EPA. U.S. EPA issued a ROD Amendment on March 30, 1990, after the CD was lodged in December 1989. The RD/RA CD was entered by the Southern District Court of Ohio on October 23, 1990. The parties to the CD formed the Pristine Trust to implement work under the CD. Subsequently,

all work under the CD, including sampling, evaluations, design, construction, and operation and maintenance (O&M) has been under the direction of the Pristine Trust with oversight by U.S. EPA and Ohio EPA. The Pristine Trust has retained the firm of Conestoga-Rovers & Associates (CRA) to conduct investigations, design, construction, and O&M functions.

The RD/RA CD includes the following restrictions to “prevent interference with the performance of remedial action and with long term maintenance of the remedy.” All of the following restrictions run with the land:

1. No obstruction, delay, or interference with the performance of the work required by the CD;
2. No extraction from the Site of water from the lower aquifer for consumptive or other use, except as required by the Remedial Action Plan (RAP, appendix in the CD);
3. No residential or commercial use of the Site;
4. No use that would allow continued presence of humans at the Site, other than presence necessary for the implementation of the remedial action; and
5. No installation, construction, removal, or use of any buildings, wells, pipes, roads, ditches, or any other structures at the Site except as consistent with the CD.

The March 30, 1990, ROD Amendment changed the soil component portion of the remedy to the following:

- On-site incineration included the top one foot of soil across Zone A of the Site (see Figure 3) and defined sediment areas, and all other soils from ground surface to four feet below ground surface that contain SVOCs and pesticides in excess of soil performance goals. The first Explanation of Significant Differences (ESD), dated July 30, 1993, changed the thermal treatment from incineration to thermal desorption and relaxed the target soil concentration for individual PAHs to 1,000 µg/kg, because it was impracticable to detect PAHs at the previous target concentration of 14 µg/kg;
- Placement of incinerator residues under a soil cap, which covers Zone A, if the residues meet the substantive RCRA delisting criteria;
- Dewatering the upper 12 feet of soil under Zone A and dewatering the Magic Pit portion of Zone B (see Figure 3) so that these soils can be treated by an ISVE system;
- ISVE of on-site soil to a depth of approximately 12 feet below the original ground surface over Zone A and within the Magic Pit area of Zone B;

- Construction of an off-gas control system for air emissions from the ISVE system; and
- Treatment of the upper aquifer water from the ISVE system using carbon adsorption.

The City of Reading well field, which supplied water to more than 15,000 people, included a number of wells, some of which were located 400 feet northwest of the Site. In March 1994, the well field was closed as a result of Ohio EPA administrative proceedings that documented groundwater contamination. The City of Reading's municipal water is now supplied by the City of Cincinnati.

Construction of the remedy for the Pristine, Inc. Site was conducted in five phases. The first phase, demolition of on-site structures, was completed in January 1992. During the demolition, a large portion of the metal from the facility was decontaminated and recycled. Debris from the facility demolition was disposed off-site in a U.S. EPA-approved landfill.

The second phase, thermal treatment of soil by thermal desorption technology, was conducted in 1993 and 1994. Approximately 13,000 tons of contaminated soil were treated and placed back on-site. The treated soil was delisted prior to on-site placement. Extensive compliance testing occurred during the operation of the thermal desorption unit, and compliance was maintained throughout the life of the project.

The third phase, which included construction of an ISVE system and cap, was conducted in 1994 through 1998. The ISVE system contains a series of trenches and wells to remediate the soil and groundwater in the upper zones of the Site. The ISVE system removes approximately 5 gallons per minute (gpm) of groundwater and 1,000 cubic feet per minute of soil gas for subsequent treatment. The ISVE system was constructed by 1996 but did not initiate operation until October 1997, when the 150 gpm pump and treatment system initiated operation. U.S. EPA issued a second ESD in April 1996 that waived Ohio's anti-degradation discharge rule (OAC 3745-1-05), based on a determination that it would be technically impracticable to achieve the anti-degradation-based discharge limits for discharge to Mill Creek from the treatment system. The delay in the ISVE system start up was because the ISVE and 150 gpm treatment systems use the same air emission control equipment, which included catalytic oxidation and scrubbing. Continuous operation of the south branch of the ISVE system was further delayed until February 1998 because there was concern that high concentrations of fluorinated VOCs would result in poisoning the catalyst. To address this concern, a carbon adsorption unit was installed to treat soil gas from the south branch before the gas went to the catalytic oxidizer. The ISVE system is expected to operate for up to 10 years.

The fourth phase, construction of the 150 gpm pump and treatment system, was conducted in 1997 and started operation in October 1997. The 150 gpm system treats groundwater extracted from on-site lower aquifer extraction well EW1 (30-35 gpm), the ISVE shallow groundwater system (5 gpm), and off-site, lower aquifer extraction wells EW2 (35 gpm) and EW3 (80 gpm). The treatment train for the groundwater consists of metals precipitation, air stripping and carbon

adsorption. A supplemental air stripper (Air Stripper 1A) was added in 1998 to aid in the removal of VOCs from the Site groundwater. The two air strippers operate in series to treat VOCs down to a concentration of 5 µg/l or less (with the exception of methyl ethyl ketone, which is not amenable to stripping). Until recently, the off-gas from Air Stripper 1 was treated by the same catalytic oxidizer and scrubber used to treat the ISVE emissions. In August 2001, U.S. EPA approved a request from CRA to allow the catalytic oxidizer to be deactivated, since the influent concentrations had been reduced to acceptable levels.

The fifth and final phase, construction of the 300 gpm system, was conducted in 1998 and initiated operation in October 1998. The 300 gpm system is designed to clean up and treat groundwater from the lower aquifer farther downgradient from the Site. While the system was being constructed, an extensive investigation was conducted to delineate the contamination within the lower aquifer. The 300 gpm system includes extraction wells EW4 (150 gpm) and EW5 (150 gpm). The treatment train consists of metals precipitation and air stripping. The air stripping tower is designed to treat all VOCs down to a concentration of 5 µg/l or less with the exception of methyl ethyl ketone. Groundwater pumped and treated in the 300 gpm system is combined with the treated groundwater from the 150 gpm system and discharged to Mill Creek. The combined discharge was designed to meet final effluent limitations and monitoring requirements that went into effect in June and October of 2000. Ohio EPA later issued a revised discharge authorization in October 2003 that includes less stringent discharge limitations for arsenic, copper, lead, and nickel, based on the results of the Dissolved Metals Translator Study prepared by a Pristine Trust consultant in July 2002.

On September 30, 1998, U.S. EPA issued a Preliminary Close-Out Report to document that all construction activity had been completed at the Site. The Site is now in its ninth year of Operation and Maintenance (O&M) activities.

In March 2002, at the request of U.S. EPA, the Pristine Trust lowered the overall groundwater pumping rate from 450 gpm to 375 gpm. U.S. EPA requested this pumping rate reduction because the pump and treat system had been drawing in TCE contamination from a plume southwest of the Site and DCE contamination west of the Site, neither of which appear to be related to the Site.

In January 2006, U.S. EPA approved CRA's Preliminary Human Health Risk Assessment (PHHRA). U.S. EPA requested that the Pristine trust perform this risk assessment because one of the findings of the 2001 Five-Year Review Report was that certain chemicals such as vinyl chloride were found in the soil but did not have cleanup goals identified in the ROD. For future industrial and construction worker pathways and for current and future trespasser pathways, the PHHRA concluded that there is no significant risk from on-site soil. The PHHRA will be finalized after soil VOC concentrations have been verified when the ISVE system is shut down.

In March 2006, U.S. EPA approved a second groundwater pumping rate reduction from 375 gpm to 150 gpm, due to a VOC plume from the G.E. facility west of the Site. At 375 gpm, the zone of influence for the Pristine pump and treat system had extended to the area of the G.E. plume.

Institutional Controls

Institutional controls (IC) are non-engineered instruments such as administrative and legal controls that help to minimize the potential for exposure to contamination and protect the integrity of the remedy. Institutional controls are required to assure long-term protectiveness for any areas which do not allow for unlimited use or unrestricted exposure (UU/UE).

Relative to the Site, ICs are required where waste is left in place (i.e., under the soil cap) and where groundwater and soil cleanup levels exceed health-based standards. The groundwater pump and treat and ISVE remedy components require protection by the ICs to ensure successful, ongoing implementation. Restricted-use areas will be shown on an IC map that will be part of the IC Plan.

The following table documents the current restricted areas of the Site and the corresponding IC objectives:

Restricted Area (area that does not allow unlimited use or unrestricted exposure)	Institutional Control Objective
Area of the Site where soil is being remediated to ROD cleanup levels (Zone A and Zone B of Figure 3)	prohibit commercial and residential use of the area
Site remedial components, including groundwater pump and treat system and in-situ vapor extraction system	prohibit interference with the systems
Area of the Site where the groundwater plume exceeds the cleanup goals	prohibit consumptive use of the groundwater plume area until cleanup goals are achieved
Area of Site with soil cap (Zone A of Figure 3)	prohibit interference with the cap and maintain the cap

The Pristine Trust is responsible for monitoring the ICs; and federal, state, and local entities have enforcement authority as described below. As a result of an August 10, 2005 request from U.S. EPA to the Pristine Trust to conduct an IC study, the Trust's legal representative submitted the study to U.S. EPA on October 13, 2005. The study includes a February 15, 2006 addendum showing the Site survey and a July 12, 2006 addendum showing a copy of the deed restrictions filed with the Recorder of Hamilton County (Attachment 1). U.S. EPA considers the deed restrictions to be more of the nature of a deed notice, which serves as an informational IC rather than a proprietary IC that "runs with the land." The document labeled and purported to be a "Deed Restriction" does not satisfy Ohio requirements for an environmental covenant or easement because the document does not identify a grantee endowed with the right to enforce the

restrictions delineated in the document. Because of the enforceability issues surrounding the document, U.S. EPA will hereinafter refer to the document labeled and purported to be a “Deed Restriction” as a “deed notice.” Based on the IC study and U.S. EPA review of the study, the following text summarizes the status of the ICs associated with the Site.

- The Site is subject to three of the four types of ICs defined in U.S. EPA guidance: governmental controls, enforcement and permit controls, and informational device controls. The three types of controls which are currently in place are described in this section.

Governmental controls in place for this Site include the following:

- ORC §3734.02(H) prohibits filling, grading, excavating, building, drilling, or mining on a former hazardous waste or solid waste facility without authorization from the Director;
- OAC Chapter 3701-28, et seq. prohibits installing, modifying, or closing private wells without a permit;
- City of Reading and Ohio Zoning Codes classify the Site location in a zone where permitted use is heavy industrial, and Ohio Basic Building Code requires a permit to erect building improvements to real property; and
- Ohio Common Law prohibits trespass.

Enforcement and permit controls in place include the following:

- The U.S. EPA Remedial Design and Remedial Action (RD/RA) CD contains governmental controls as ARARs that restrict land and groundwater use, set applicable cleanup standards, incorporate IC requirements, and identify violations subject to federal court and statutory sanctions;
- The State of Ohio CD between Ohio EPA and Pristine, Inc. documents enforcement for violations of State law, subject to federal court and State statutory sanctions;
- The City of Reading closed its municipal well field in March 1994, as a result of an Ohio EPA mandate (the City’s compliance being subject to Ohio EPA and State of Ohio court enforcement); and
- The City of Reading’s police power enforces the prohibition of trespassing on private property.

Informational Device Controls include the following:

- The deed notice was recorded with the Hamilton County Recorder’s Office on January 24, 2006;

- The legal description of the Site in the deed notice, in the Access Agreement, and in the deeds by which the current title owners acquired title are the same. As noted previously, the Site survey (which is part of the IC study) has been revised to identify encumbrances;
- The RD/RA CD (recorded with the Hamilton County Recorder's Office on August 28, 2006) requires deed restrictions;
- The CD requires that the CD and deed restrictions be recorded in the Hamilton County Recorder's Office;
- Site history and status is available through FOIA and the Ohio Public Document request procedures;
- Site history and status is easily available by accessing the websites maintained by U.S. EPA and Ohio EPA;
- Environmental Site Assessments (Phase I) locate relevant information about the Site (e.g., 42 U.S.C. §9601(35)(B)); and
- Easements shown in the Site survey impact the Site. The recorded access agreement between the property owners and the Trustees shows the existence of the deed notice.
- The Pristine Trust conducted a title commitment on February 10, 2006 as part of the IC study. The title commitment shows the current status of the title, and land and groundwater restrictions. The Trust obtained a new Site survey to identify encumbrances. The following are significant findings identified in the title commitment:
 - Right-of-way easements exist on and near the Site to provide ingress and egress for utilities;
 - The Site is part of a larger parcel of 13.327 acres owned by the same owners that own the Site property; and
 - Access agreements are in place to implement the RA.
- Identification of any encumbrances that negatively impact existing land and groundwater restrictions: The Trust has a Site survey to identify easements. Utility easements predate listing the Site on the NPL. There are no mortgages on the 13-acre property and no foreclosure history. Consideration should be given to seeking subordination agreements from the utilities.
- Assessment of whether there is compliance with land and groundwater restrictions, whether the ICs are preventing exposure, whether land or resource use has changed since the ROD,

whether the owner has any plans to sell or transfer the property, how current land and resource uses relate to exposure assumptions and risk calculations, and whether there are any unintended consequences from a particular restriction:

The deed notice has been implemented; although, U.S. EPA does not consider it to be a proprietary control. U.S. EPA is unaware of any noncompliance by the owner. The Site is secured and is managed by the Trust's project manager (CRA) according to the U.S. EPA-approved O&M Plan. U.S. EPA is unaware of any instances of unauthorized entry. Certain changes have occurred on or near the Site since the ROD, most notably the shutdown of the Reading well field and the construction of a sanitary sewer overflow system north of the Site. The owner has no plans to sell or transfer the property. The remedy, including the ICs, has prevented exposure to risk. CRA has worked with U.S. EPA and Ohio EPA to ensure that the Human Health Risk Assessment is up to date. U.S. EPA is unaware of any unintended consequences from a particular restriction.

- U.S. EPA believes that the current monitoring program by CRA is satisfactory. However, the O&M Plan should be modified to include mechanisms to ensure regulatory inspections, annual IC certification, and a communications plan.
- For future land use, it is anticipated that the Site will continue to be occupied and maintained by the Pristine Trust for the duration of the remedial program to implement the CD. Institutional controls will continue to be used to control access and future use of the Site as required by the CD. The owners reported that they have no plans to sell the property.

Several ICs are in place for the Site. They appear to be protective of human health and the environment. However, the ICs are not functioning as intended since no proprietary controls are in place. Additional ICs such as implementing an environmental covenant that "runs with the land" under the UECA and exploring listing the Site in the Ohio One-Call system will be considered in the IC Plan.

V. PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

Protectiveness Statement from the Last Five-Year Review Report

The following protectiveness statement was taken, with minor editing, from the September 28, 2001 Five-Year Review Report.

Although the remedial actions are being properly implemented, U.S. EPA cannot determine at this time whether the remedy is currently protective of human health and the environment because Ohio EPA and U.S. EPA have not evaluated the significance of the sporadic total residual chlorine exceedances in the groundwater. The following actions need to be taken to ensure the long-term protectiveness of the remedy:

- the extent of trichloroethene groundwater contamination at the southwestern edge of the monitoring well network needs to be characterized;
- health risks from chloroform, 1,1-dichloroethene, methylene chloride, vinyl chloride, and tetrachloroethene in soil need to be further evaluated and protective soil target concentrations established;
- health risks from methylene chloride, pentachlorophenol, chlorobenzene, ethylbenzene, toluene, lead and bis(2-ethylhexyl)phthalate in groundwater need to be further evaluated and protective groundwater target concentrations established;
- methylene chloride and vinyl chloride need to be added to the parameter list for the annual soil gas measurements and for the final soil sampling to evaluate achievement of the target soil concentrations;
- methylene chloride and bis(2-ethylhexyl)phthalate need to be added to the parameter list for groundwater sampling; and
- periodic sampling of the monitoring wells in the shallow lenses needs be conducted.

Status of Implementing Recommendations from the Last Five-Year Review Report

The following list of recommendations was taken from the September 28, 2001 Five-Year Review Report. After each recommendation, the progress made to implement the recommendation since U.S. EPA issued the report is shown in bold type.

- It is possible that the groundwater pump and treatment system is pulling a significant plume of trichloroethene at the southwestern end of the monitoring well network. This will have to be monitored over the years. In addition, an investigation into the source and extent of this trichloroethene contamination should be conducted.

In March 2002, U.S. EPA approved a lower groundwater pumping rate. Since the lower pumping rate has been in effect, groundwater data indicate that the TCE plume is not being drawn in by the Pristine pump and treat system. Groundwater studies conducted and U.S. EPA review of monitoring results indicate that the TCE plume is not Site-related. U.S. EPA, Ohio EPA, and the Pristine Trust will continue to monitor the effects of reduced pumping on the TCE plume.

- U.S. EPA, Ohio EPA and the Pristine Trust need to cooperate in locating and addressing the source of the total residual chlorine that is causing periodic exceedances of the discharge limitation. U.S. EPA and Ohio EPA need to evaluate the significance of the recent periodic exceedances of the discharge limitation for total residual chlorine.

The total residual chlorine exceedances may have been due to a leak of potable water from a nearby property. The problem has been corrected. Also, the CRA lab has changed its analytical method for chlorine, due to the previous method yielding inaccurate results.

- The Pristine Trust wants to conduct sampling to evaluate whether the discharge limitations for some metals is more stringent than necessary. Ohio EPA and U.S. EPA need to review this sampling.

A Pristine Trust consultant completed the Dissolved Metals Translator Report for the Site in July 2002. The report led to U.S. EPA allowing less stringent discharge limitations for arsenic, copper, lead, and nickel. Ohio EPA issued a revised discharge authorization in October 2003 that includes these higher limits.

- U.S. EPA, Ohio EPA and the Pristine Trustees need to conduct further evaluation of the health risks from chloroform, 1,1-dichloroethene, methylene chloride, vinyl chloride, tetrachloroethene and TCDD, in order to establish target soil concentrations that will be protective of human health and the environment, and achieve ARARs at the end of the remedial actions.

In January 2006, U.S. EPA approved CRA's January 2006 PHHRA. This report considered the potential effects of residual concentrations of chemicals and parameters in Site soils, soil gas, and shallow upper aquifer groundwater. The assessment also considered the potential effects of leaching from Site soils to the underlying lower aquifer groundwater. The assessment found that all carcinogenic and non-carcinogenic risks from contaminants in soil were not significant. U.S. EPA will evaluate the ROD cleanup goals for soil based on the results of the PHHRA.

- U.S. EPA, Ohio EPA and the Pristine Trustees need to conduct further evaluation of the health risks from methylene chloride, pentachlorophenol, chlorobenzene, ethylbenzene, toluene, lead and bis(2-ethylhexyl)phthalate, in order to establish target groundwater concentrations that will be protective of human health and the environment and achieve ARARs at the end of the remedial actions.

The above-mentioned contaminants generally have non-detect readings in groundwater monitoring results; therefore, U.S. EPA feels that further evaluation is not needed at this time. However, U.S. EPA plans to re-evaluate ROD cleanup levels for groundwater to ensure they are protective of human health and the environment.

- The following parameters need to be added to the Sampling and Analysis Plan: methylene chloride and vinyl chloride in the annual soil gas measurements and in the final soil sampling to evaluate achievement of the target soil concentrations; methylene chloride in the annual groundwater sampling; and bis(2-ethylhexyl)phthalate to the five-year interval groundwater sampling.

All of the above-mentioned contaminants have been added to the existing monitoring programs.

- A more complete review of historical metals data should be conducted to characterize the metals concentrations that remain on-site. If metals concentrations are low, and target soil and groundwater concentrations are achieved, then it is possible that the Site should be available for unrestricted use after completion of the remedial actions.

CRA's PHHRA, approved by U.S. EPA in January 2006, concluded that contamination in on-site soils does not present a significant risk to human health. At this time, U.S. EPA does not foresee the Site being available for unrestricted use.

- In 2001, in order to monitor the pace of cleanup in the shallow groundwater lenses below the Site, the Pristine Trust agreed to sample the available on-site monitoring wells. This sampling should continue, concurrent with future rounds of groundwater sampling, to monitor the pace of cleanup of the shallow groundwater lenses, and to determine when this groundwater meets the groundwater cleanup targets.

To act on this recommendation, CRA added wells to the shallow groundwater lens monitoring network. CRA continues to include these wells in its annual groundwater sampling events. The Data Review section of this Five-Year Review Report comments on the effectiveness of the pump and treat system to expeditiously meet groundwater cleanup goals.

- The final effluent limitations and monitoring requirements for the Site are listed in Attachment 2. Due to the fact that these criteria were established during the last year, they were not re-evaluated during this Five-Year Review. However, the elevated interim limit for MEK was reviewed. Ohio EPA recommends that MEK continue to have interim limits of 100 µg/l, 30-day average, and 200 µg/l, daily maximum, until the next Five-Year Review in September 2006. Final Ohio MEK permit limits for the effluent discharge from the groundwater treatment system will be set at that time, if appropriate.

MEK contaminant levels for effluent discharge have been non-detect at the Site. Ohio EPA has not set final permit limits for MEK at the Site; however, due to the low MEK levels, U.S. EPA and Ohio EPA do not consider this a high priority. If MEK levels become significant, Ohio EPA will set final permit limits.

- Background concentrations of arsenic in soil and groundwater should be determined.

In a February 14, 2005 memo to U.S. EPA, CRA developed a background concentration of arsenic in soil of 12.6 milligrams per kilogram, with a 95 percent upper confidence limit. CRA used this information in its January 2006 PHHRA that U.S. EPA approved. CRA also issued a March 14, 2005 memo with additional

information on background concentrations of arsenic in soil. The studies cited in the memo show background arsenic concentrations in soil similar to the value developed by CRA above.

In its February 14, 2005 memo, CRA referred to an Ohio EPA study for background concentrations of arsenic in groundwater. The study, summarized on the Ohio EPA website, documented groundwater arsenic concentrations in Ohio public supply wells to be less than 10 micrograms per liter. However, since all of the wells sampled cannot be considered background, the true background concentration would be lower. The CRA memo also included reference to USGS studies of background arsenic concentrations in groundwater, and noted that the CRA-detected concentrations of arsenic in lower aquifer groundwater samples fell within the range of detected values from the Ohio EPA and USGS studies. U.S. EPA has not yet finalized an arsenic background level in groundwater.

VI. FIVE-YEAR REVIEW PROCESS

Administrative Components

The U.S. EPA Remedial Project Manager (RPM), Ron Murawski, notified Ohio EPA, USGS, the Pristine Trustees, and their consultant (CRA) of the initiation of the five-year review process in the spring of 2006. Ron Murawski headed the five-year review team, which included Ohio EPA (whose primary contact for the review is Site Coordinator Scott Glum) and USGS (whose primary contact for the review is hydrogeologist Rob Darner).

The review schedule included the following components:

- Community Notification;
- Document Review;
- Data Review;
- Site Inspection;
- Interviews; and
- Five-Year Review Report Development and Review.

Community Notification

On June 8, 2006, the U.S. EPA Office of Public Affairs placed an ad in the Cincinnati Enquirer announcing that the Five-Year Review was in progress and requesting that any interested parties contact U.S. EPA for more information. See Attachment 2.

Since the ad was issued, no member of the community voiced an interest in the Five-Year Review.

Document Review

This Five-Year Review consisted of a review of relevant documents, including O&M monitoring reports and monitoring data, the 1987 ROD and subsequent amendments, and related reports (see Table 2). The regulatory team also reviewed applicable cleanup standards as listed in the ROD.

Data Review

Review of Groundwater Contaminant Data

U.S. EPA concluded from its review of groundwater contaminant sampling results for the Site that the groundwater pump and treat component of the remedy is effectively reducing the 1,2-DCA contaminant plume and that progress is being made toward the expeditious achievement of groundwater cleanup goals.

Figure 4 shows how the 1,2-DCA groundwater plume has decreased from 1999 to 2005. This figure also shows that the highest 1,2-DCA concentrations are closest to the Site and that the pump and treat system has been effective over time at reducing the 1,2-DCA contaminant levels away from the Site. Since U.S. EPA approved a significant reduction in the groundwater pumping rate in March 2006 (due to an encroaching VOC plume from the G.E. facility), U.S. EPA, with assistance from Ohio EPA and USGS, will review future groundwater sampling results to ensure that the pump and treat system continues to decrease the 1,2-DCA plume.

Figure 5 shows that the groundwater component of the remedy is causing 1,2-DCA contaminant levels to decrease over time toward cleanup goals. U.S. EPA review of sampling results for other VOCs indicates similar reductions in contaminant levels over time.

Figure 6 shows that there is off-site TCE contamination present. The sampling results used are from monitoring wells west of the Site where the TCE contamination is present. Based on a review of sampling results over time, U.S. EPA believes that this TCE contamination is not Site-related. To minimize the effect of the Pristine pump and treat system drawing in off-site, VOC contamination (including TCE contamination), U.S. EPA has approved two pumping rate reductions.

Table 3 also indicates that the groundwater portion of the remedy is progressing toward meeting VOC cleanup goals. This table shows groundwater cleanup goals versus the latest, lower aquifer sampling results for certain, strategic wells in the monitoring network. The highest and most frequent exceedances are associated with 1,2-DCA. This is expected, because PRP and USGS documents have identified the 1,2-DCA plume as the most extensive, Site-related, contaminant plume. As noted above, the groundwater pump and treat system has been attenuating this plume over time. With the exception of 1,2-DCA, Table 3 shows that most VOC sampling results are near or below cleanup goals.

Table 4 shows groundwater cleanup goals versus the latest, lower aquifer sampling results for certain, strategic wells in the monitoring network for SVOCs, pesticides/PCBs, and metals. This table shows that non-VOC levels in groundwater are almost all non-detect. The only detects shown are of arsenic. However, this Five-Year Review Report points out that the arsenic cleanup goal for groundwater is unrealistically low and needs to be revised, and background concentrations need to be considered. Therefore, Table 4 shows that non-VOC contaminant levels in groundwater are generally not an issue.

Figures 7-10 are potentiometric surface maps of the lower aquifer. Figure 7 shows groundwater levels before the March 2002 pumping rate reduction, and Figure 8 shows levels after the reduction. Figures 9 and 10 show a similar effect of the March 2006 pumping rate reduction. Comparing these two sets of figures with Figure 4 of the 1,2-DCA plume shows that the groundwater pump and treat system has had full capture and appears to still have adequate capture of the 1,2-DCA plume. This is another example of the effectiveness of the groundwater component of the remedy. More data is needed before U.S. EPA can say with confidence that the current, reduced pumping rate is still fully capturing the 1,2-DCA plume.

Table 5 shows the pounds of VOCs removed per year by the 150 gpm treatment system, the 300 gpm treatment system, and the ISVE. The table shows that the pump and treat system has been effective at removing VOCs from the groundwater. Since the magnitude of the groundwater contaminant plume has been decreasing (due to the effectiveness of the pump and treat system), the poundage of VOCs removed per year has also been decreasing.

Review of In-situ Soil Vapor Extraction Data

The groundwater pump and treat system also collects and treats soil vapors extracted from below the Site cap in Zone A and from the former magic pit area in Zone B. Table 5 shows that the ISVE system has been effective at removing VOCs from the soil vapor stream. The decreasing trend of pounds of VOCs removed per year is consistent with the decreasing trend of pounds of VOCs removed per year from the groundwater.

Table 6 shows gas monitoring probes that have had recent action level exceedances (from May 2003 forward), and how the contaminant levels have decreased over time. This table provides further support that the ISVE system component of the remedy is working effectively.

Besides showing the September 1997 baseline results, Table 6 shows the latest three rounds of documented results (Round 9 in May 2003, Round 10 in May 2004, and Round 11 in June 2005). The table shows that more action level exceedances occurred during the baseline event than in the recent sampling rounds. Also, there are 120 soil vapor probes in the sampling network. Table 6 shows that only 25 of the 120 probes have had recent soil vapor action level exceedances, and that, even among the probes with exceedances, the soil vapor levels have been decreasing over time.

Site Inspection

U.S. EPA, Ohio EPA, and USGS conducted a Site inspection on June 1, 2006. CRA and the Pristine Trustees accompanied and assisted the regulatory team in the inspection. The purpose of the inspection was to assess the protectiveness of the remedy, including the condition of fencing to restrict access, the integrity of the cap, the condition of the monitoring and extraction wells and other physical devices associated with the remedy, and the condition and operation of the treatment plant. The inspection revealed that the physical aspects of the remedy were operating properly and/or in good condition.

The following statements summarize the main topics covered during the inspection:

- The soil cap was in good physical condition. The grass cover was thick and had been recently mowed. There were no signs of erosion.
- The perimeter fence was in good condition. Gates were padlocked and connected to an alarm system.
- ISVE control stations and pumps appeared to be in proper working order.
- Showers and eye wash stations in the treatment plant were working properly.
- The piezometers, monitoring wells, and extraction wells checked were not damaged and appeared to be in proper working order.
- Physical and computer checks of the effluent discharge to Mill Creek indicated proper operation.
- Piping and tanks in the treatment plant, including aerator tanks, sludge tanks, carbon vessels, and bulk acid tanks, appeared to be in proper working order.
- The extraction well and ISVE monitoring station was operating properly.
- The ISVE control stations were operating properly.
- There appeared to be an adequate amount of safety supplies in the treatment plant.
- Chemicals and equipment used to operate the treatment plant were properly stored.
- The filter press and roll-off apparatus used for collecting the solid waste from the treatment process appeared to be in proper working order.
- The flocculators and clarifiers appeared to be in proper working order.

- The continuous emissions monitor, which monitors VOC levels in the air from the treatment plant, appeared to be operating properly.
- The electrical station for the extraction wells appeared to be in proper working order.

Interviews

The RPM interviewed Ohio EPA (Scott Glum) and USGS (Rob Darner) on June 1, 2006, at the CRA West Chester, Ohio office. On the same day, the RPM also interviewed the Pristine Trustees (Martha Farr, Dave Ross, and Bob Fremont) and the Pristine Trustees' Project Manager, CRA (Henry Cooke), at the West Chester office.

After talking to Scott Glum and others, the RPM decided not to interview the following entities for the following reasons:

- There are no nearby community residents, and there has been no community interest in recent years in the Site or Site operations.
- There have been no local officials involved with any aspects of the Site operations in recent years.
- The Site owners do not want to be involved in Site operations. Over the years, they have reluctantly granted access to the Site property and adjoining property for various activities. Based on the history of communications of the agencies, the Trustees, and CRA with the owners, the RPM felt that the owners would not want to be interviewed and would not add value to the process.

All interviewees felt that the remedy was working properly. Ohio EPA and USGS felt that CRA performed the O&M activities effectively and that CRA shares the results of its O&M activities effectively with the agencies. In addition, the interviewees provided the following input on the Site and remedy implementation:

Ohio EPA and USGS

- The groundwater contaminant levels have been decreasing over time, indicating that the pump and treat operation is working effectively. However, the agencies need to closely review the groundwater data resulting from the recently approved pumping rate reduction, to ensure that groundwater remediation will continue expeditiously toward cleanup goals.
- Ohio EPA is also concerned as to if and when the pump and treat system will return to its original pumping rate of 450 gpm.
- Ohio EPA would like to have better communication with the U.S. EPA Region 5 Waste, Pesticides, and Toxics Division (WPTD) on the progress of G.E. to reduce the nearby VOC groundwater contaminant plume. (The encroaching plume onto the Pristine, Inc. Site

property was the reason for U.S. EPA approving the recent pumping rate reduction for the Site.) G.E. has coordinated water level measurement activities effectively with the agencies, the Pristine Trustees, and CRA.

- The agencies need to study groundwater monitoring results more closely from CRA wells to the west and south of the Site, to determine whether off-site contamination is encroaching onto the Site.
- Some of the groundwater cleanup goals in the ROD are unrealistic. The arsenic and beryllium cleanup goals are unrealistically low because they are based on surface water standards. Since the ROD was issued, pentachlorophenol has been reclassified from a noncarcinogen to a carcinogen; therefore, this contaminant should have a lower cleanup goal than what is shown in the ROD. The soil cleanup goal in the ROD for chloroform does not consider the inhalation pathway; therefore, the cleanup goal should be much lower. A soil cleanup goal for vinyl chloride is needed in the ROD. The ROD should be amended to use revised cleanup goals based on cumulative, overall risk.

(Note: U.S. EPA will evaluate ROD cleanup goals for soil based on the results of the PHHRA.)

- The 1987 ROD is outdated because it assumes a completed risk pathway associated with the operation of the nearby Reading well field. The Reading well field was closed in 1994, and Reading residents now receive their drinking water from the Cincinnati public water supply. Also, at the time of the ROD issuance, a trailer park existed near the Site. That trailer park no longer exists. In general, the ROD does not accurately reflect what is occurring at and near the Site.
- Ohio EPA said that there were no changes in State laws or regulations related to the remedy.

The Pristine Trustees and CRA

- The remedy is working properly and is in compliance with the 1990 RD/RA CD.
- Off-site contamination is of concern, as are the related issues of a possibly longer O&M period due to a reduced pumping rate, and the need to keep close contact with G.E. The Trustees hope that Ohio EPA and U.S. EPA will work more closely with G.E. to have G.E. accelerate its efforts to control and reduce its groundwater contaminant plume.
- The Site owners have not impeded the O&M work. The access agreements run with the land; so, they would be in place even if ownership changed. The owners help the Trustees when requested but don't want to be part of the O&M process. The owners contribute to the Pristine facility trust fund for O&M activities.
- During construction of the MSDGC sanitary sewer overflow project immediately north of the Site, MSDGC damaged some Site O&M wells but since repaired them. Also, Site

groundwater levels were impacted early due to the MSDGC project, but water levels were unaffected once MSDGC stopped pumping groundwater.

- The Trustees and CRA are satisfied with the relationship with and responsiveness of U.S. EPA and Ohio EPA.
- The Trustees want U.S. EPA to make sure that the money received from the Formica bankruptcy is deposited in the Pristine special account and that the Trustees can use that money to fund O&M activities. Formica is a PRP. The annual cost of operating the remedy is between \$1.8 million and \$2.0 million, with about \$750,000 of that amount needed to operate the treatment plant.
- Neighboring entities have been cooperative. The Trust has agreements with the City of Reading to install monitoring wells as needed. Rohm & Haas has been cooperative, too.

VII. TECHNICAL ASSESSMENT

Question A: Is the remedy functioning as intended by the decision documents?

Review of the documents, ARARS, risk assumptions, monitoring data, and the results of the Site inspection indicate that the remedy is functioning as intended by the ROD, ROD Amendment, and ESDs. The data review section of this report indicates that remedy implementation is expeditiously progressing toward attainment of cleanup goals.

The soil cap, the groundwater pump and treat system, and the ISVE system are all functioning as intended by the decision documents.

According to the latest semi-annual report for the Pristine Facility Trust Fund (submitted by the Pristine Trustees to the RPM on July 14, 2006), the cost from January through June 2006 to implement the remedy, including the cost to operate the treatment plant, was about \$730,000, not including federal oversight costs. This equates to an annual cost to implement the remedy of about \$1.5 million. In the 1996 ESD, O&M cost for a comparable system was estimated to be “in excess of \$20 million for the 30 years of O&M.” Using a year 2006 reference and a seven percent discount rate, the ESD estimate of the annual O&M cost is about \$1.3 million. This figure compares favorably with the current, projected cost of \$1.5 million. However, it is unclear from the ESD what the O&M cost estimate includes; therefore, the ESD estimate may not be comparable to the cost projected from the Pristine Facility Trust Fund report.

Access controls such as fencing, locks, and alarms are in place to prevent exposure. Several ICs are in place for the Site. The deed notice and CD have been recorded with the local Recorder’s Office. They appear to be protective of human health and the environment. However, the ICs are not functioning as intended since no proprietary controls are in place. Additional ICs such as implementing an environmental covenant that “runs with the land” under the UECA and exploring listing the Site in the Ohio One-Call system will be considered in the IC Plan. The IC

Plan will be used to periodically evaluate the effectiveness of the land and groundwater use restrictions.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

There have been no changes in the physical conditions of the Site that would adversely affect the protectiveness of the remedy.

Changes in Standards and To be Considereds (TBC)

A list of the primary applicable or relevant and appropriate requirements (ARARs) are included in Table 7. There have been no changes in these ARARs. U.S. EPA and Ohio EPA are unaware of any TBCs for the Site.

Changes in Exposure Pathways

In March 1994, as a result of Ohio EPA administrative proceedings that documented groundwater contamination, the City of Reading well field was shut down, and the City of Reading was connected to Cincinnati's public water supply. This eliminated the potential exposure of City of Reading public water supply users to Site groundwater contaminants. The lower aquifer remains a potential source of drinking water where restrictions do not exist. Groundwater use restrictions exist for the Site. Implementation of an IC Plan will determine what additional ICs are needed beyond the Site boundaries.

Changes in Toxicity and Other Contaminant Characteristics

Since U.S. EPA issued the ROD, pentachlorophenol was reclassified from a non-carcinogen to a carcinogen. The groundwater cleanup goal for pentachlorophenol should be revised to reflect this new toxicity information. The cleanup goals in the ROD and RAP (an attachment to the RD/RA CD) will be revised to reflect the revised cleanup goal for pentachlorophenol.

Changes in Risk Assessment Methods

U.S. EPA has learned that some Site contaminants were not evaluated properly in the initial Human Health Risk Assessment and in the development of the ROD. The needed re-evaluations include:

- Arsenic and beryllium groundwater cleanup levels were based on surface water standards. U.S. EPA will develop revised groundwater cleanup levels for arsenic and beryllium based on drinking water MCLs or groundwater background levels. U.S. EPA will finalize a Site background level for arsenic in groundwater after reviewing recent, relevant studies.

- The ROD soil cleanup level for chloroform did not consider the inhalation pathway. Also, no vinyl chloride soil cleanup level was included in the ROD, even though vinyl chloride is present in the soil. In January 2006, U.S. EPA approved CRA's PHHRA, which showed that soil contaminant levels do not pose a significant risk to human health. The PHHRA included chloroform and vinyl chloride in its scope. The report showed that all calculated, carcinogenic risk values for soil were less than 10^{-6} , and the calculated hazard indices were less than 1.0. U.S. EPA will use the information from the CRA report to determine what, if any, changes need to be made for soil cleanup levels in the ROD. The results of the PHHRA indicate that no new Site areas need to be restricted and that existing use restrictions for the soil pathways are sufficiently protective. Site use restrictions are already in place that include the intended remedy objectives.
- Not all ROD cleanup levels were based on cumulative risk. U.S. EPA should evaluate all ROD cleanup levels to make sure they consider cumulative risk.

Expected Progress Toward Meeting the RAOs

The Site cleanup has progressed as expected to meet the Site remedial action objectives.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No other events have affected the protectiveness of the remedy, and there is no other information that calls into question the protectiveness of the remedy.

Technical Assessment Summary

The Pristine, Inc. Site remedy is functioning as intended by the ROD, ROD Amendment, and ESDs. Progress is being made toward meeting Site soil and groundwater cleanup levels. There have been no changes in the physical conditions of the Site that would adversely affect the protectiveness of the remedy.

Cleanup levels for groundwater and soil should be revisited and potentially revised to reflect new information about the toxicity of pentachlorophenol and to address deficiencies of the risk assessment methodology applied at the time of the ROD (arsenic and beryllium groundwater cleanup levels based on surface water standards, no consideration of the inhalation pathway for chloroform in soil, no vinyl chloride soil cleanup level, and not basing all cleanup levels on cumulative risk). Site soil cleanup levels should be re-evaluated based on the findings and conclusions in the PHHRA.

There is no other available information that calls into question the protectiveness of the remedy.

VIII. ISSUES

Table 8: Issues

Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
1. Cleanup levels for Site contaminants do not reflect current risk assessment practice and current toxicology. The groundwater and soil cleanup levels in the ROD do not reflect the effects of cumulative risk in all cases. The groundwater cleanup level for pentachlorophenol does not consider that this contaminant is now classified as a carcinogen. There is no soil cleanup level for vinyl chloride. The soil cleanup level for chloroform did not consider the inhalation pathway. The groundwater cleanup levels for arsenic and beryllium are based on surface water standards, not background levels or drinking water standards.	N	Y
2. Institutional Controls (IC) were implemented at the Site but need to be supplemented with: 1) an environmental covenant that “runs with the land” pursuant to the UECA; 2) maps (paper and electronic versions) of all areas that require land and groundwater use restrictions; 3) evaluation of the adequacy of governmental controls; and 4) revision to the O&M Plan to include mechanisms to ensure regular inspection of ICs at the Site, annual certification, and a communications plan.	N	Y

IX. RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Table 9: Recommendations and Follow-up Actions

Issue	Recommendation/ Follow-up Action	Party Respon- sible	Oversight Agency	Mile- stone Date	Affects Protectiveness? (Y/N)	
					Cur- rent	Future
1.	Cleanup levels in the ROD for Site contaminants that reflect current risk assessment practice and current toxicology should be evaluated. Conclusions in the Preliminary Human Health Risk Assessment should be considered to determine their effect on current soil cleanup levels. If groundwater and soil cleanup levels are developed that appreciably affect the extent of cleanup at the Site, a ROD Amendment or Explanation of Significant Differences may be necessary.	U.S. EPA	None	12/31/08	N	Y

Issue	Recommendation/ Follow-up Action	Party Respon- sible	Oversight Agency	Mile- stone Date	Affects Protectiveness? (Y/N)	
					Cur- rent	Future
2.	Preparation of an IC Plan that includes the following: 1) consideration to implementing additional ICs at the Site such as an environmental covenant that “runs with the land” pursuant to the UECA; 2) preparation of maps (paper and electronic versions) of all areas that require land and groundwater use restrictions; 3) evaluation of the adequacy of governmental controls; and 4) provision for revision to the O&M Plan to include mechanisms to ensure regular inspection of ICs at the Site, annual certification, and a communications plan.	U.S. EPA	None	March 2007	N	Y

X. PROTECTIVENESS STATEMENT

The remedy is currently protective of human health and the environment. All immediate threats at the Site have been addressed; there is no evidence of exposure to Site-related contaminants; and the existing Site and groundwater uses are consistent with the objectives in the remedy and deed notice. Long-term protectiveness requires groundwater and soil cleanup goals to be achieved, continued operation of the remedy, compliance with use restrictions described in the deed notice, and implementation of additional ICs that “run with the land” along with additional assurances that ICs are monitored.

XI. NEXT REVIEW

The next Five-Year Review for the Pristine, Inc. Superfund Site is required by September 2011, five years from the date of this review.

TABLES

Table 2: List of Documents Reviewed

Consent Decree (for Remedial Design and Remedial Action); U.S. EPA; September 1990

Declaration for the Record of Decision; Pristine, Inc. Site; U.S. EPA; December 31, 1987

Explanation of Significant Differences for the Pristine, Inc. Superfund Site; U.S. EPA; April 24, 1996

Explanation of Significant Differences for the Pristine, Inc. Superfund Site; U.S. EPA; July 30, 1993

Hydrogeology and Groundwater Quality, Reading and Lockland, Ohio; United States Geological Survey; 2004

ISVE Round 11 Soil Gas Sampling and Analysis; Pristine, Inc. Site; CRA; October 17, 2005

Interim Five-Year Review; Pristine, Inc. Site; September 28, 2001

Preliminary Close-Out Report for the Pristine, Inc. Superfund Site; U.S. EPA; September 30, 1998

Record of Decision Amendment for the Pristine, Inc. Superfund Site; U.S. EPA; March 30, 1990

Round Nineteen Monitoring Well Sampling Results; Pristine, Inc. Site; CRA; October 26, 2005

Year Eight Operation and Maintenance Annual Report; Pristine, Inc. Site; CRA; February 2006

Table 3: VOC Groundwater Cleanup Levels vs. Latest Sampling Results

Groundwater Well			MW68	MW69	MW70	MW79	MW84	MW85	MW86	MW89	MW90	MW91	MW95
Sample Date			7/14/05	7/14/05	7/13/05	7/14/05	7/26/05	7/26/05	7/22/05	7/25/05	7/19/05	7/19/05	7/13/05
	Units	Performance Goal											
1,1,1-Trichloroethane	µg/L	200	ND(170)	0.24J	ND(1.0)	ND(1.0)	0.73J	2.0	ND(6.7)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)
1,1-Dichloroethene	µg/L	0.033	ND(170)	ND(1.0)	ND(1.0)	ND(1.0)	0.54J	ND(1.0)	ND(6.7)	ND(1.0)	ND(1.0)	0.19J	0.27J
1,2-Dichlorobenzene	µg/L	75	ND(170)	3.2	ND(1.0)	ND(1.0)	ND(2.0)	ND(1.0)	ND(6.7)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)
1,2-Dichloroethane	µg/L	0.94	4700	0.43J	0.56J	0.23J	39	8.1	290	0.80J	3.8	6.4	25
Benzene	µg/L	0.67	ND(170)	ND(1.0)	ND(1.0)	ND(1.0)	ND(2.0)	ND(1.0)	4.6J	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)
Chlorobenzene	µg/L	488	ND(170)	ND(1.0)	ND(1.0)	0.26J	ND(2.0)	ND(1.0)	ND(6.7)	0.46J	ND(1.0)	ND(1.0)	ND(1.0)
Chloroform	µg/L	0.19	34J	0.18J	ND(1.0)	ND(1.0)	0.59J	0.93J	6.1J	ND(1.0)	ND(1.0)	ND(1.0)	0.69J
Ethylbenzene	µg/L	2400	44J	ND(1.0)	ND(1.0)	ND(1.0)	ND(2.0)	ND(1.0)	ND(6.7)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)
Tetrachloroethene	µg/L	0.88	ND(170)	0.28J	ND(1.0)	0.25J	ND(2.0)	ND(1.0)	ND(6.7)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)
Toluene	µg/L	15000	29J	ND(1.0)	ND(1.0)	ND(1.0)	ND(2.0)	ND(1.0)	ND(6.7)	ND(1.0)	ND(1.0)	ND(1.0)	ND(1.0)
Trichloroethene	µg/L	2.8	ND(170)	0.61J	ND(1.0)	2.5	1.3J	0.89J	ND(6.7)	13	17	21	0.49J
Vinyl Chloride	µg/L	0.02	ND(170)	ND(1.0)	2.6	ND(1.0)	ND(2.0)	ND(1.0)	3.2J	ND(1.0)	0.23J	0.27J	0.51J

Notes for Tables 3 and 4:

Bold type indicates a performance goal exceedance.

J - Estimated

ND - Non-detected at associated value listed in parentheses

na - not analyzed

Table 4: SVOCs/Pesticides/PCBs/Metals Groundwater Cleanup Levels vs. Latest Sampling Results

[illegible]

Table 5: Pounds of VOCs Removed per Year

YEAR	150 gpm TREATMENT SYSTEM	300 gpm TREATMENT SYSTEM	ISVE SYSTEM
1997	302.3*	NA	129.1*
1998	4,618.2	18.4*	878.5
1999	3,475.4	540.1	76.2
2000	1,584.5	703.3	93.0
2001	867.8	353.0	119.2
2002	417.8	104.6	99.7
2003	244.7	69.7	77.9
2004	198.1	45.2	44.0
2005	128.0	28.8	36.3

Asterisked amounts correspond to partial years of operation. Also, in March 2002, U.S. EPA approved a reduction in pumping rates from 150 and 300 gpm to 125 and 250 gpm, respectively.

Table 6: Soil Vapor Levels Over Time for Probes with Recent Action Level Exceedances

Page 1 of 4

Compound Units Soil Gas Action Level	1,1-DCE - 1,1 Dichloroethene µg/L 261.28				CHCl ₃ - Chloroform µg/L 294.69			
	Baseline	Round 9	Round 10	Round 11	Baseline	Round 9	Round 10	Round 11
	Location							
SG-A6	10	ND (0.40)	ND (1.0)	ND (0.4)	150	0.59	ND (1.0)	ND (0.4)
SG-A19	2	ND (0.40)	ND (0.40)	ND (0.4)	ND(0.20)	ND (0.40)	ND (0.40)	ND (0.4)
SG-A19 ⁽¹⁾	2	--	ND (0.40)	ND (0.4)	ND(0.20)	--	ND (0.40)	ND (0.4)
SG-A34	--	3.3	0.41 J	ND (0.4)	--	3.3	ND (0.40)	ND (0.4)
SG-A35	ND(4)	2.0	ND (2.0)	4.9 J	100	35	ND (2.0)	9.6 J
SG-A36	--	ND (2.0)	--	ND (0.4)	--	ND (2.0)	--	ND (0.4)
SG-A39	ND(4)	ND (1.0)	ND (1.0)	ND (0.8)	430	3.0	ND (1.0)	ND (0.8)
SG-A41	ND(0.20)	ND (0.40)	ND (2.0)	ND (1.0)	2	ND (0.40)	ND (2.0)	ND (1.0)
SG-N2 CC	ND(4)	ND (0.40)	ND (0.40)	ND (0.4)	ND(1)	0.99	0.89 J	0.9
SG-N3 BB	19	1.4	7	3.7	28	7.4	15	5.4
SG-N4 BB	ND(4)	ND (10)	ND (2.0)	ND (0.4)	2300	56	29	6.4
SG-N4 CC	ND(10)	ND (0.40)	ND (0.40)	ND (0.4)	ND(2)	0.48	ND (0.4)	ND (0.4)
SG-N6 BB	200	1.3	0.99	ND (0.4)	220	5.9	5.5	ND (0.4)
SG-N6 CC	10	ND (0.40)	2	2.1	ND(5.00)	ND (0.40)	ND (1.0)	ND (0.4)
SG-N7 AA	130	ND (1.0)	33	50	ND(96)	ND (1.0)	ND (1.0)	2.3
SG-N8 BB	36	0.58	--	96	1	ND (0.40)	--	0.9 J
SG-N9 BB	86	27	17	17	ND(10)	1.4	1.2	ND (4.0)
SG-N11 AA	--	ND (1.0)	ND (1.0)	ND (1.0)	--	ND (1.0)	ND (1.0)	ND (1.0)
SG-N11 BB	--	ND (0.40)	ND (1.0)	ND (4.0)	--	ND (0.40)	ND (1.0)	ND (4.0)
SG-N13 AA	21	8.5	5.5	5.8 J	ND(0.50)	ND (1.0)	ND (0.4)	ND (0.4)
SG-N16 AA	54	ND (0.40)	ND (0.4)	ND (0.4)	ND(0.20)	ND (0.40)	ND (0.4)	ND (0.4)
SG-N17 AA	ND(1)	ND (0.40)	ND (0.4)	ND (0.4)	ND(0.20)	ND (0.40)	ND (0.4)	ND (0.4)
SG-N18 BB	9	ND (0.40)	ND (0.4)	ND (0.4)	ND(0.50)	ND (0.40)	ND (0.4)	ND (0.4)
SG-N20 AA	ND(1)	ND (0.40)	ND (0.4)	ND (0.4)	ND(0.20)	ND (0.40)	ND (0.4)	ND (0.4)
SG-N21 BB	ND(2)	ND (0.40)	ND (1.0) UJ	ND (1.0)	ND(0.60)	ND (0.40)	ND (1.0)	ND (1.0)

Table 6: Soil Vapor Levels Over Time for Probes with Recent Action Level Exceedances

Page 2 of 4

Compound Units Soil Gas Action Level	1,2-DCA- 1,2 Dichloroethane µg/L 1.55				TCE- Trichloroethene µg/L 25.02			
	Baseline	Round 9	Round 10	Round 11	Baseline	Round 9	Round 10	Round 11
	Location							
SG-A6	ND(51)	3.0	8.8	0.4	4	ND (0.40)	ND (1.0)	0.4 J
SG-A19	ND(10)	ND (0.40)	ND (0.40)	ND (0.4)	1	ND (0.40)	ND (0.40)	ND (0.4)
SG-A19 ⁽¹⁾	ND(10)	--	ND (0.40)	ND (0.4)	1	--	ND (0.40)	ND (0.4)
SG-A34	--	27	3.5 J	ND (0.4)	--	1.2	ND (0.40)	ND (0.4)
SG-A35	230	130 J	17	66 J	ND(1)	ND (1.0)	ND (2.0)	ND (0.4)
SG-A36	--	14 J	--	3.0	--	ND (2.0)	--	ND (0.4)
SG-A39	ND(210)	15	ND (1.0)	8.2	ND(1)	ND (1.0)	ND (1.0)	ND (0.8)
SG-A41	28	3.7	68	77	0.06	ND (0.40)	ND (2.0)	ND (1.0)
SG-N2 CC	ND(140)	4.1	4.7 J	2.5	ND(1)	ND (0.40)	ND (0.40)	ND (0.4)
SG-N3 BB	ND(2000)	4.3	14	5.4	31	8.0	31	7.6
SG-N4 BB	ND(1000)	160	110	12	5	ND (10)	ND (2.0)	ND (0.4)
SG-N4 CC	ND(610)	2.4	ND (0.40)	ND (0.4)	ND(2)	ND (0.40)	ND (0.40)	ND (0.4)
SG-N6 BB	ND(32000)	3.1	1.3	0.9	130	1.6	1.8	1.7
SG-N6 CC	ND(9300)	9.6	10	19	11	1.5	3.4	2.1
SG-N7 AA	ND(72000)	ND (1.0)	ND (1.0)	2.9	64	6.1	75 J	170
SG-N8 BB	ND(40)	ND (0.40)	ND (1.0)	7.1	2	ND (0.40)	--	3.2
SG-N9 BB	ND(56000)	ND (1.0)	ND (1.0)	ND (4.0)	42	15	12	3.9 J
SG-N11 AA	--	1.7	1.4	ND (1.0)	--	ND (1.0)	ND (1.0)	ND (1.0)
SG-N11 BB	--	ND (0.40)	ND (1.0)	ND (4.0)	--	ND (0.40)	ND (1.0)	ND (4.0)
SG-N13 AA	26	6.7	4.6	3.0 J	10	2.4	1.2	ND (0.4)
SG-N16 AA	16	0.57	ND (0.40)	ND (0.4)	4	ND (0.40)	ND (0.40)	ND (0.4)
SG-N17 AA	ND(5.00)	ND (0.40)	ND (0.40)	ND (0.4)	0.8	ND (0.40)	ND (0.40)	ND (0.4)
SG-N18 BB	ND(5)	ND (0.40)	ND (0.40)	ND (0.4)	300	3.9	ND (0.40)	4.0
SG-N20 AA	ND(5)	ND (0.40)	ND (0.40)	ND (0.4)	ND(0.20)	ND (0.40)	ND (0.40)	ND (0.4)
SG-N21 BB	ND(13)	ND (0.40)	ND (1.0)	ND (1.0)	16	ND (0.40)	ND (1.0)	ND (1.0)

Table 6: Soil Vapor Levels Over Time for Probes with Recent Action Level Exceedances

Page 3 of 4

Compound Units Soil Gas Action Level	PCE-Tetrachloroethene µg/L 484.77				Benzene µg/L 14.8			
Location	Baseline	Round 9	Round 10	Round 11	Baseline	Round 9	Round 10	Round 11
SG-A6	8	ND (0.40) UJ	ND (1.0)	ND (0.4)	590	4.1	23	0.4 J
SG-A19	ND(0.40)	ND (0.40) UJ	ND (0.40)	ND (0.4)	40	ND (0.40)	ND (0.40)	ND (0.4)
SG-A19 ⁽¹⁾	ND(0.40)	--	--	ND (0.4)	41	--	ND (0.40)	ND (0.4)
SG-A34	--	ND (0.40) UJ	ND (0.40)	ND (0.4)	--	8.8	1.9	ND (0.4)
SG-A35	ND(0.40)	ND (1.0) UJ	ND (2.0)	ND (0.4)	4	2.9	ND (2.0)	2.8 J
SG-A36	--	ND (2.0) UJ	--	ND (0.4)	--	ND (2.0)	--	ND (0.4)
SG-A39	1	ND (1.0) UJ	ND (1.0)	ND (0.8)	6	12	13	1.8
SG-A41	0.06	ND (0.40) UJ	ND (2.0)	ND (1.0)	ND(0.30)	ND (0.40)	ND (2.0)	ND (0.4)
SG-N2 CC	ND(0.40)	1.2 J	1.6	1.5	ND(0.70)	ND (0.40)	ND (0.40)	ND (0.4)
SG-N3 BB	24000	1000 J	4600 J	860 J	5	1.1	2.3	ND (2.0)
SG-N4 BB	8	790 J	ND (2.0)	ND (0.4)	ND(1900)	ND (10)	ND (2.0)	ND (0.4)
SG-N4 CC	ND(2)	18 J	ND (0.40)	ND (0.4)	ND(59)	ND (0.40)	ND (0.40)	ND (0.4)
SG-N6 BB	4000	69 J	62 J	49 J	ND(120)	ND (0.40)	ND (0.40)	ND (0.4)
SG-N6 CC	100	6.7 J	15	7.6	410	27	61 J	79 J
SG-N7 AA	370	25 J	260 J	540 J	ND(1)	ND (1.0)	ND (1.0)	ND (2.0)
SG-N8 BB	10	ND (0.40) UJ	--	5.0	ND(2)	ND (0.40)	ND (1.0)	1.4
SG-N9 BB	900	360 J	350 J	54	ND(1)	1.1	ND (1.0)	ND (4.0)
SG-N11 AA	--	ND (1.0)	ND (1.0)	ND (1.0)	--	7.1	3.7	ND (1.0)
SG-N11 BB	--	ND (0.40) UJ	ND (1.0)	ND (4.0)	--	26	190 J	ND (4.0)
SG-N13 AA	4	1.4	0.65	ND (0.4)	ND(240)	4.0	1.8	ND (4.0)
SG-N16 AA	0.8	14 J	ND (0.40)	ND (0.4)	44	ND (0.40)	ND (0.40)	ND (0.4)
SG-N17 AA	1	0.77	ND (0.40)	ND (0.4)	ND(0.70)	ND (0.40)	ND (0.40)	ND (0.4)
SG-N18 BB	720	42 J	ND (0.40)	36	310	ND (0.40)	ND (0.40)	ND (0.4)
SG-N20 AA	2	0.80 J	1.4	1.2	ND(0.70)	ND (0.40)	ND (0.40)	ND (0.4)
SG-N21 BB	510	34 J	88 J	48	ND(1)	ND (0.40)	ND (1.0)	ND (1.0)

Table 6: Soil Vapor Levels Over Time for Probes with Recent Action Level Exceedances
Page 4 of 4

Notes:


ND()	Not detected at or above the stated limit in parentheses
(1)	Indicates a duplicate sample
µg/L	Micrograms per liter (parts per billion (ppb))
J	The analyte was positively identified, and the associated numerical value is the approximate concentration of the analyte in the sample.
UJ	The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
—	Not analyzed
	Sample concentration or quantitation limit exceeds soil gas action level.

Table 7: List of Primary ARARs and TBCs

<u>Description of Federal ARAR</u>	<u>Reference</u>
hazardous waste management	40 CFR 260-271
groundwater maximum contaminant levels	Safe Drinking Water Act, 40 CFR 141
RCRA groundwater protection standards	40 CFR 264.94
Water Quality Criteria	40 CFR Parts 303, 304
Clean Closure and Landfill Closure	RCRA Subtitle C
Releases from Solid Waste Management Units	40 CFR 264 Subpart F
disposal or decontamination of equipment, structures and soils	40 CFR 264.114
survey plat	40 CFR 264.116
security, and post-closure care and use of property	40 CFR 264.14 and 264.117(b), (c)
corrective action	RCRA Subchapter III, 42 U.S.C. 6921-6939b
health and safety	29 CFR 1910
NPDES requirements	Clean Water Act Section 402, 40 CFR 122, 125, and 131
<u>Description of State ARAR</u>	
limits for effluent discharges	Ohio Revised Code (ORC) Chapter 6111; Ohio Administrative Code (OAC) 3745
naturally occurring and accelerator-produced radioactive materials	Ohio Department of Health
Solid and Hazardous Wastes	ORC Chapter 3734
hazardous waste regulations	OAC Chapters 3745-50 to 69
Air Pollution Control	ORC Chapter 3704; OAC Chapters 3745-15 to 25
Water Pollution Control	ORC Chapter 6111; OAC Chapters 3745-1 to 9
Safe Drinking Water	ORC Chapter 6109; OAC Chapters 3745-81 to 99

ATTACHMENTS

Attachment 1: Deed Notice Titled “Deed Restriction” for the Pristine, Inc. Superfund Site

DEED RESTRICTION

The record owners, Oren, Jane, and Pauline Long ("Owner Settling Defendants"), hereby impose restrictions on the following described real estate known as Pristine, Inc. and Cincinnati Drum Service (the "Site"):

Starting at a steel post in the Northeast corner of said Section 33; thence Southwardly in the east line of said section a distance of 1249.38 feet to a point; thence North 86 degrees 20 minutes 47 seconds West, a distance of 784.50 feet to a concrete monument in the West Right-of-Way Line of the Phil. Balt. and Washington Railroad; and the Place of Beginning of the Tract of land herein described; thence South 0 degrees 09 minutes 23 seconds West; a distance of 450.00 feet to a point; thence South 85 degrees 08 minutes 15 seconds West, a distance of 200.00 feet to an iron pin; thence South 85 degrees 08 minutes 15 seconds West, a distance of 991.03 feet to a concrete monument; thence North 3 degrees 47 minutes 23 seconds East, a distance of 61.33 feet to a concrete monument; thence North 73 degrees 17 minutes 15 seconds East, a distance of 204.00 feet to an iron pin; thence North 63 degrees 13 minutes 45 seconds East, a distance of 70.00 feet to an iron pin; thence North 43 degrees 44 minutes 38 seconds East, a distance 144.22 feet to an iron pin; thence North 8 degrees 51 minutes 45 seconds East, a distance of 158.11 feet to an iron pin; thence North 64 degrees 16 minutes 15 seconds West, a distance of 226.00 feet to a concrete monument; thence North 65 degrees 11 minutes 15 seconds West, a distance of 100.00 feet to an iron pin; thence North 70 degrees 43 minutes 39 seconds West, a distance of 100.06 feet to an iron pin; thence North 80 degrees 21 minutes 15 seconds West, a distance of 100.00 feet to an iron pin; thence North 86 degrees 47 minutes 48 seconds West, a distance of 55.10 feet to a concrete monument; thence North 3 degrees 45 minutes 45 seconds East, a distance of 34.76 feet to a point; thence South 86 degrees 14 minutes 15 seconds East, a distance of 551.74 feet to an iron pin in the center of the East Branch of Mill Creek; thence with the centerline of said creek North 47 degrees 53 minutes 45 seconds East, a distance of 137.56 feet to an iron pin; thence leaving the centerline of said creek south 86 degrees 20 minutes 47 seconds East, a distance of 685.17 feet to an iron pin in the West Right-of-Way Line of the aforesaid railroad; thence with the West line of said railroad South 0 degrees 09 minutes 23 seconds West, a distance of 100.32 feet to a concrete monument; thence South 85 degrees 17 minutes 20 seconds East 6.00 feet to the point of beginning. containing 13.327 Acres of land, more or less.

The following restrictions, paragraphs No. 1 and 2 inclusively, are imposed upon the entire Site. However, paragraphs No. 3, 4 and 5 shall only be imposed on the property upon which Pristine, Inc. conducted operations in Reading, Ohio, the adjacent ditches and the structure referred to as the Magic Pit located on Cincinnati Drum Service property, as depicted in the map attached as Appendix 10 to the Consent Decree (the "Pristine Area"). This description of the Pristine Area will be supplemented at a later date with a more formal metes and bounds legal description. The restrictions shall prevent interference with the performance of remedial action and with long term maintenance of the remedy, pursuant to the Consent Decree approved by the United States District Court for the Southern District of Ohio, Case No. C-1-89-837, on September 7, 1990, and subsequently entered in October, 1990 (the "Consent Decree") and are required by Section IV, paragraph E of the Consent Decree, and the Remedial Action Plan (the "RAP").

1. There shall be no obstruction, delay or interference with the performance of any work required pursuant to the Consent Decree nor with the operation or effectiveness of the remedial action constructed or installed pursuant to the Consent Decree and attachments thereto.
2. There shall be no extraction from the Site of water from the lower aquifer for consumptive or other use, except as required by the RAP.
3. There shall be no residential or commercial use of the Site, including but not limited to, the construction, installation or use of any structures or buildings for residential or commercial purposes. This prohibition includes use of the property for storage of drums.
4. There shall be no use of the Site that would allow the continued presence of humans at the Site, other than any presence necessary for implementation of remedial action under the Consent Decree.

5. There shall be no installation, construction, removal or use of any buildings, wells, pipes, roads, ditches or any other structures at the Site except as consistent with the Consent Decree and the Remedial Action Plan which is Appendix 2 to the Consent Decree.

All of the above restrictions shall run with the land and be binding upon the owners and their respective successors, assigns and transferees. The restrictions set forth in paragraphs No. 1 and 5 above shall continue in perpetuity. The remaining restrictions shall remain in full force and effect unless and until U.S. EPA issues a determination in writing or the Court rules to either modify or terminate the restrictions in response to a petition from the Owner Settling Defendants, as provided below. A copy of these restrictions shall be provided to all respective successors, assigns and transferees.

After all the Work, as defined in the Consent Decree, has been completed and upon achievement of performance and clean-up standards, consistent with the Consent Decree and the RAP, the Owner Settling Defendant may petition the Regional Administrator of the U.S. EPA, Region V, or his delegate, to modify or terminate the deed restrictions in paragraphs 2 through 4 above. Any petition for modification or termination shall state the specific provision sought to be modified or terminated and the proposed additional uses of the property. Any proposed modifications or terminations must not be inconsistent with the requirements set forth in the ROD, the RAP, the RD/RA Work Plan, or the Consent Decree.

The property owners shall provide the Settling Defendants a copy of any petition for modification or termination of deed restriction submitted to U.S. EPA. Any party may object to the proposed use of the Site on the grounds that such use may expose humans, animals or plants to soil contaminants remaining at the Site, cause wind dispersal or surface run-off to carry soil contaminants off the Site, or cause migration of contaminants beyond the Site boundaries, or into the groundwater, in excess of the Cleanup Standards set forth in Section VI and Appendix 2 of the Consent Decree. Any party so objecting shall notify the owners, the U.S. EPA, and the State of Ohio in writing, within thirty (30) days of receipt of the proposed modification or termination. The Regional Administrator may allow or deny Owner Settling Defendant's petition or portions of the petition. Any dispute as to the Regional Administrator's determination is subject to the jurisdiction of the United States District Court for the Southern District of Ohio. However, U.S. EPA reserves its right to argue before the Court for record review and the appropriate standard of review of the Administrator's determination.

If any provision of this Deed Restriction is held to be invalid by any court of competent jurisdiction, the invalidity of such provision shall not affect the validity of any other provisions hereof. All such other provisions shall continue unimpaired in full force and effect.

If any provision of this Deed Restriction is also the subject of any law or regulation established by any federal, state or local government, the stricter of the two standards shall prevail.

No provision of this Deed Restriction shall be construed so as to violate any applicable zoning laws, regulations or ordinances. If any such conflict does arise, the applicable zoning laws, regulations or ordinances shall prevail, unless they are inconsistent with CERCIA.

The undersigned persons executing these Deed Restrictions on behalf of the Owner Settling Defendants represent and certify that they are duly authorized and have been fully empowered to execute and deliver these Deed Restrictions.

IN WITNESS WHEREOF, the said Owner Settling Defendants of the Site have caused these Deed Restrictions to be executed on this 9th day of OCTOBER, 1990.

OWNER SETTLING DEFENDANTS

By: Oren Long
Oren Long

By: Jane Long
Jane Long

By: Pauline Long
Pauline Long

ATTEST:

Mary Jo Zwerin

AS TO OREN LONG and
JANE LONG

Mary Jo Zwerin

AS TO OREN LONG and
JANE LONG

ATTEST:


AS TO PAULINE LONG

AS TO PAULINE LONG

State of Kentucky)
County of Kenton) SS:

Before me, a Notary Public in and for said County and State, personally appeared Oren Long, Jane Long, and respectively, Owner Settling Defendants, and acknowledge the execution of the foregoing Deed Restrictions on the Pristine, Inc. Site for and on behalf of said Owner Settling Defendants.

Witness my hand and Notarial Seal the 9 day of October, 1990.


Notary Public

My County of Residence:

My Commission Expires: 7/30/91

This document was prepared by:
Nancy-Ellen Zusman
Assistant Regional Counsel
Office of Regional Counsel
U.S. Environmental Protection Agency
230 South Dearborn
Chicago, Illinois 60604
(312) 886-7161

Phillip Schwarzer
Dinsmore & Shohl
2100 Fountain Square Plaza
511 Walnut Street
Cincinnati, Ohio 45202
(513) 977-8241

Attachment 2: Newspaper Ad Announcing the Pristine, Inc. Superfund Site Five Year Review



**EPA to Conduct Review of
Pristine Superfund Site
Reading, Ohio**

U.S. Environmental Protection Agency and state partner Ohio EPA will be reviewing beginning June 1 the cleanup actions taken at the Pristine Superfund site. The Superfund law requires a review at least every five years at sites where cleanup action has been started but hazardous substances remain on-site. These reviews are done to ensure the cleanup continues to protect human health and the environment. A review was previously done in 2001.

This review will include an evaluation of background information, cleanup requirements, effectiveness of the cleanup, and any anticipated future actions. EPA selected several cleanup actions for the site in 1987 and 1990:

- Decontamination, demolition and disposal of on-site structures;
- Thermal treatment of the top 1 foot of soil and sediment and the top 4 feet of soil surrounding a dumping area that are contaminated with polycyclic aromatic hydrocarbons or pesticides;
- Construction of a multi-media cap built to federal standards over the thermally treated soil;
- Treatment by soil vapor extraction of the upper 12 feet of soil contaminated by VOCs;
- Deed and cap access restrictions; and
- Pump and treatment of contaminated ground water.

The demolition and soil thermal treatment were completed in 1994. Soil treatment by soil vapor extraction and a source area ground-water pump-and-treat system has been in operation since 1997. A down-gradient water pump and treatment system have been in operation since 1998. The five-year review report, which details the site's progress, will be available at the site's official document repository, which is located at:

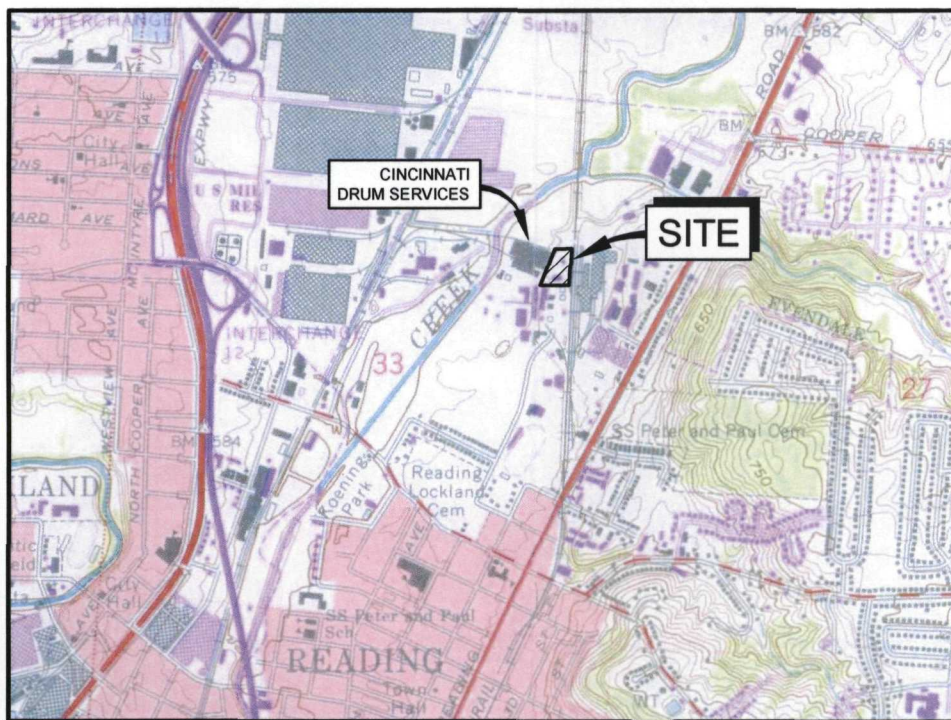
**Public Library of Cincinnati and Hamilton County
10980 Thornview Drive
Sharonville, Ohio**

Further information can be obtained by contacting:

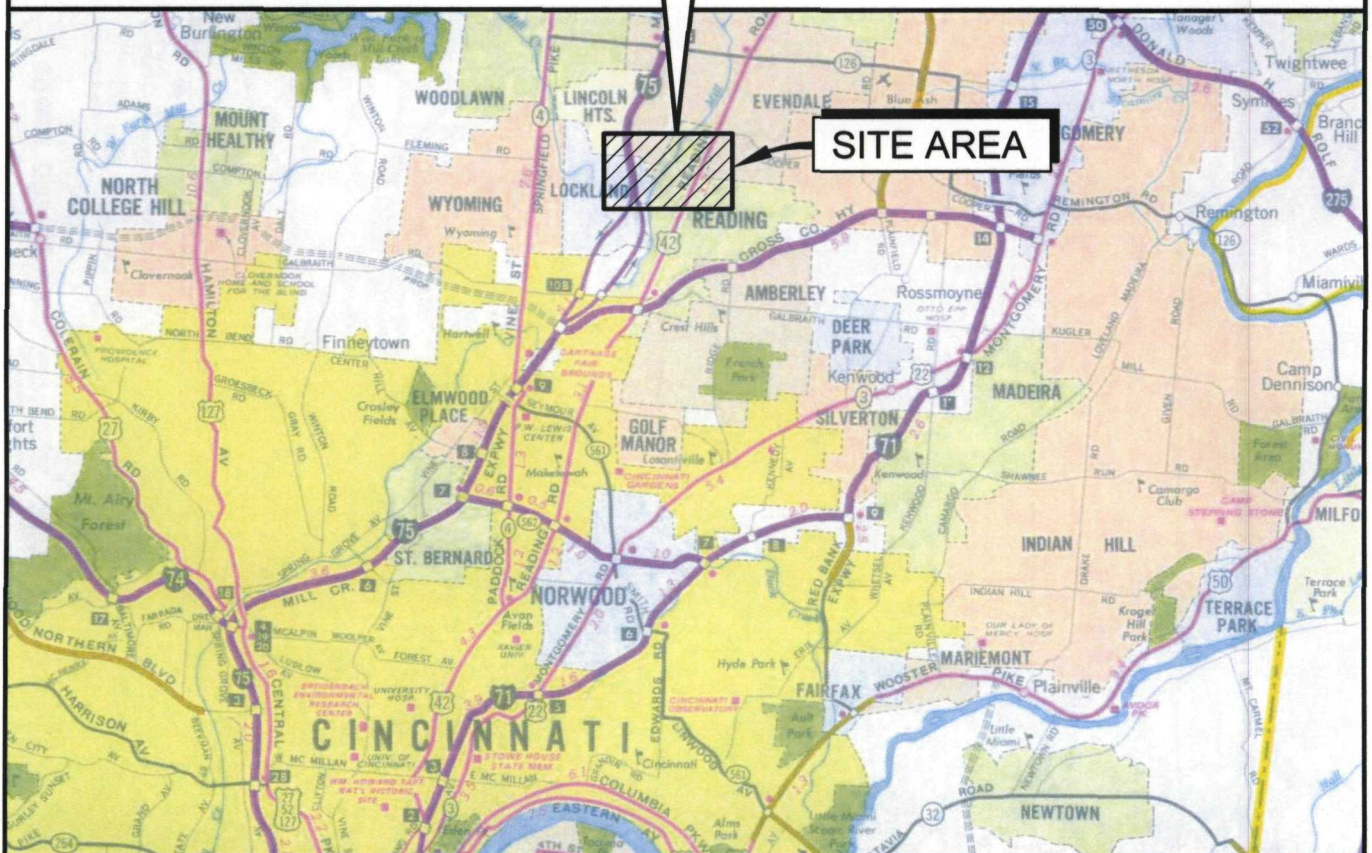
Rafael Gonzalez

EPA Community Involvement Coordinator
(800) 621-8431 x60269, weekdays 10 a.m.-5:30 p.m.
gonzalez.rafael@epa.gov

FIGURES



SOURCE: USGS QUADRANGLE MAP;
CINCINNATI EAST, OHIO



SOURCE: 1991 GOUSHA ROAD ATLAS

figure 1

PRISTINE, INC. SITE LOCATION
IN RELATION TO THE CINCINNATI, OHIO AREA

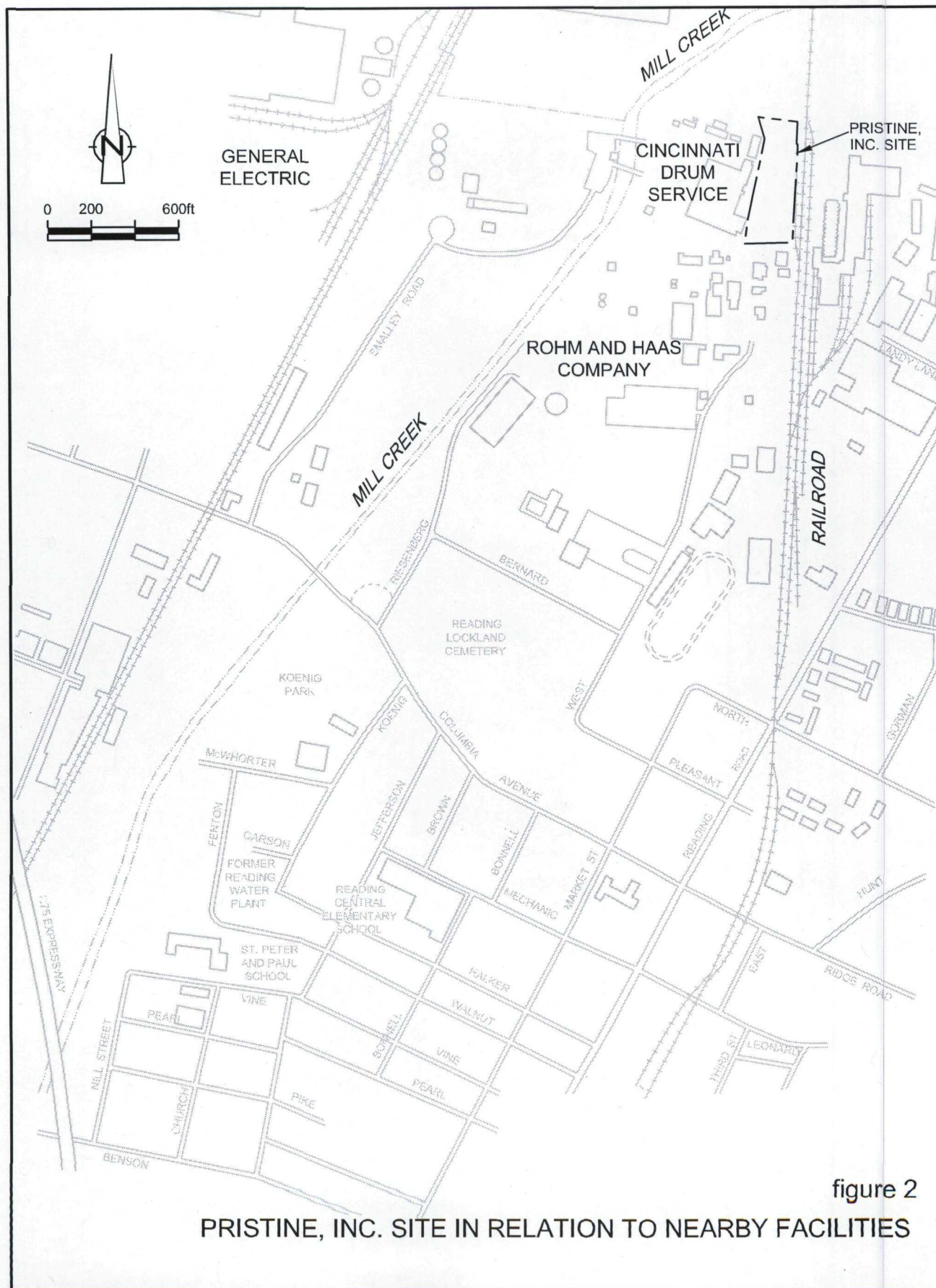
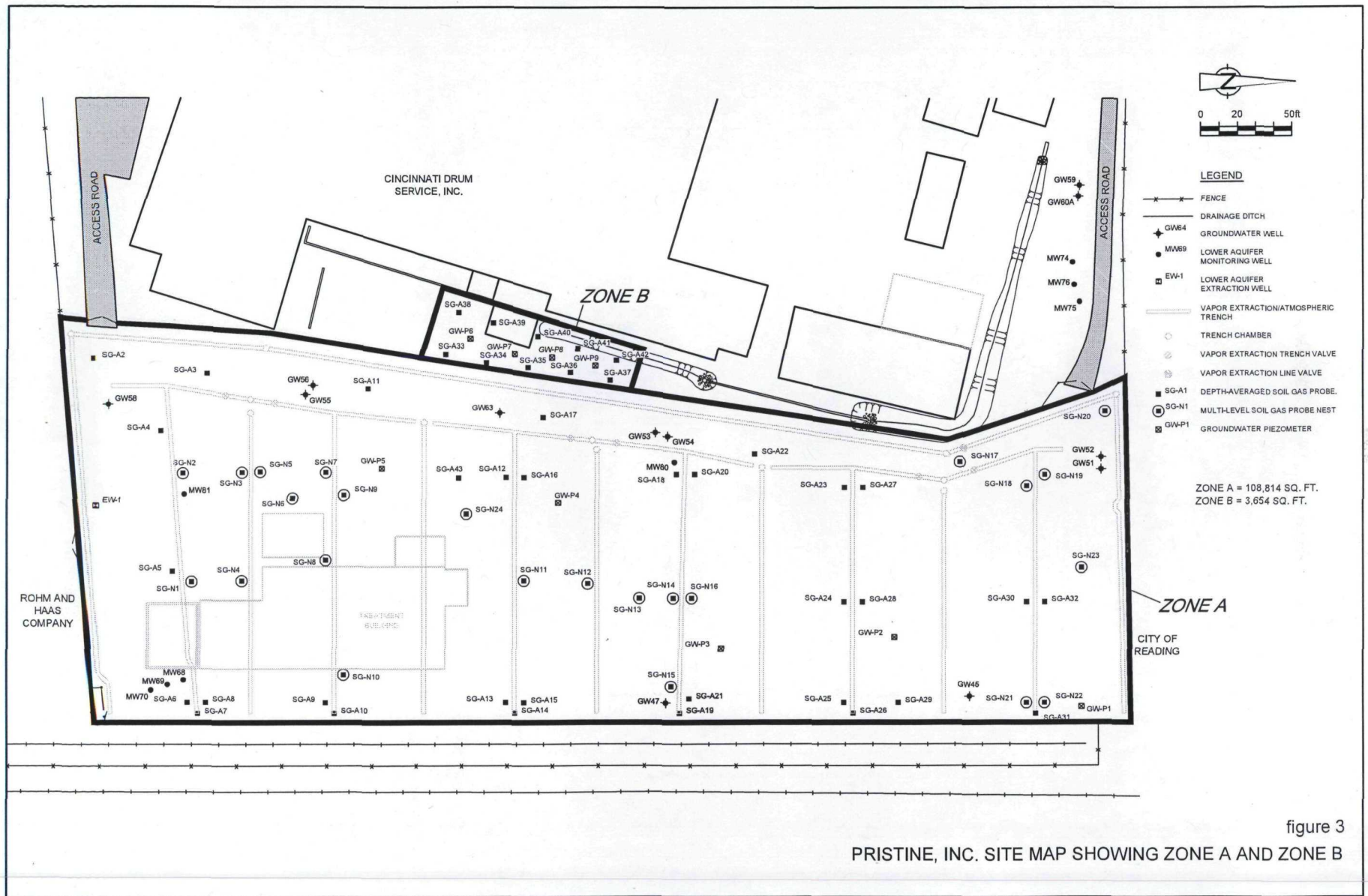
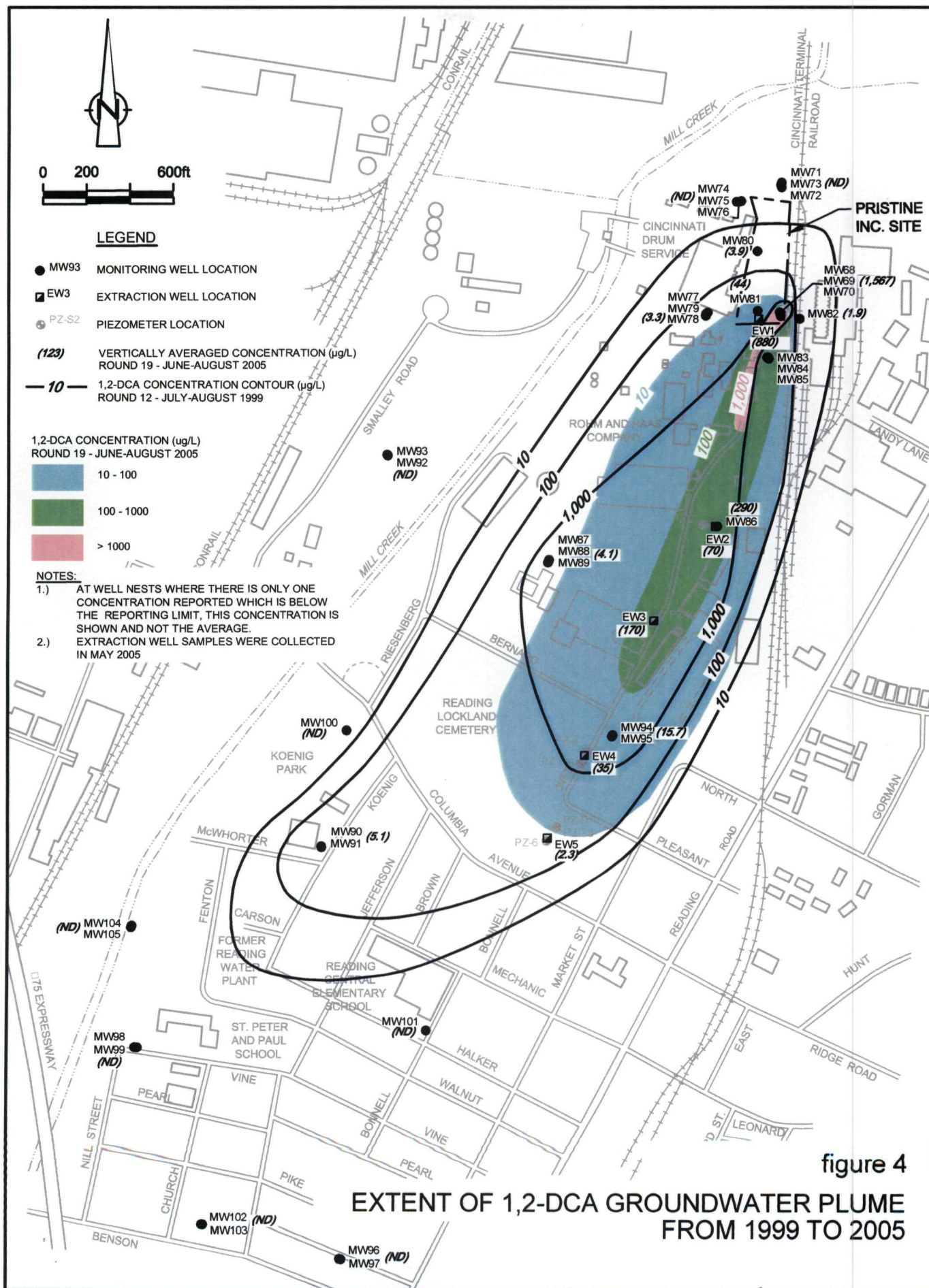


figure 2
PRISTINE, INC. SITE IN RELATION TO NEARBY FACILITIES





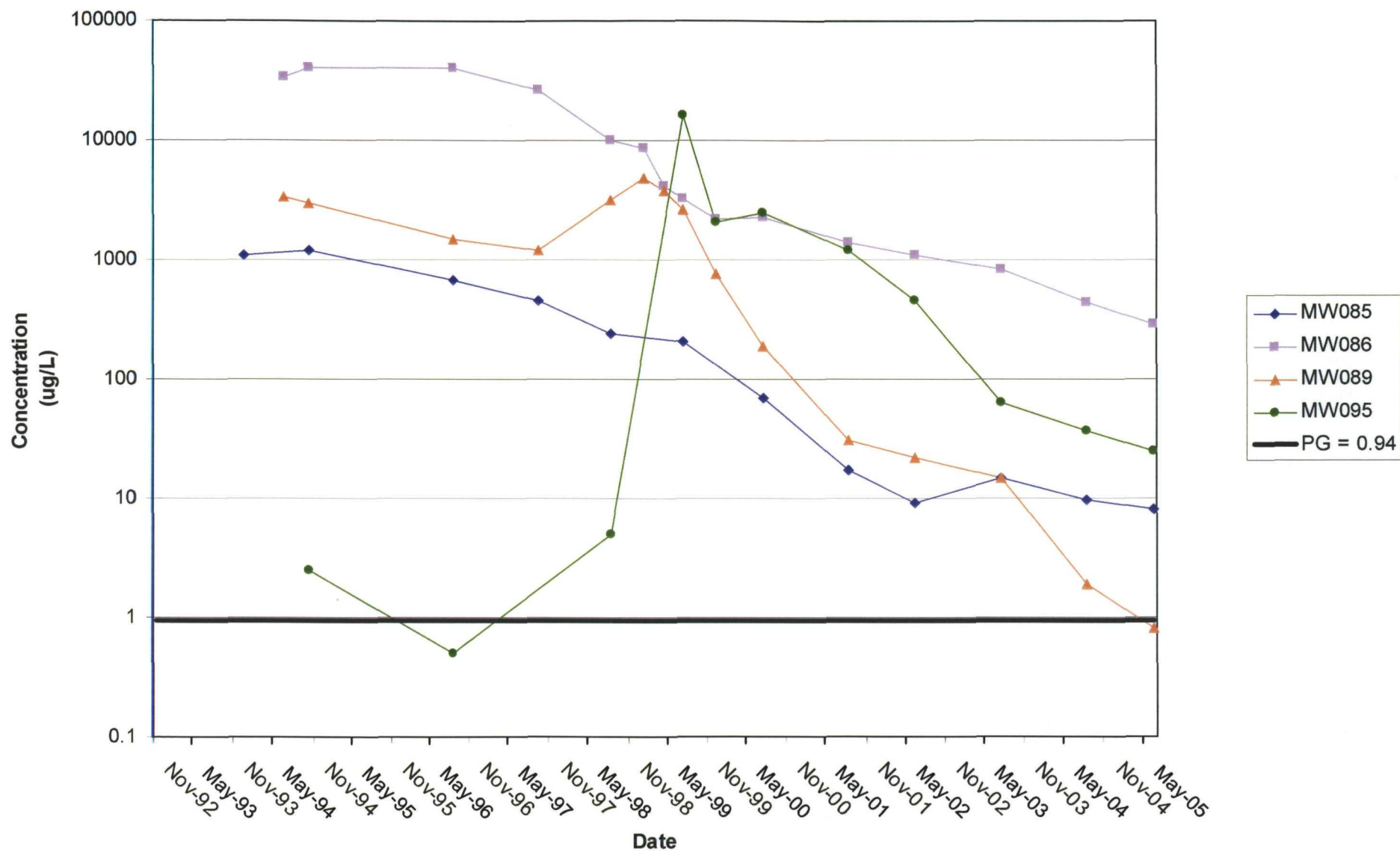


figure 5

1,2-DCA LOWER AQUIFER SAMPLING RESULTS OVER TIME FOR SELECTED WELLS

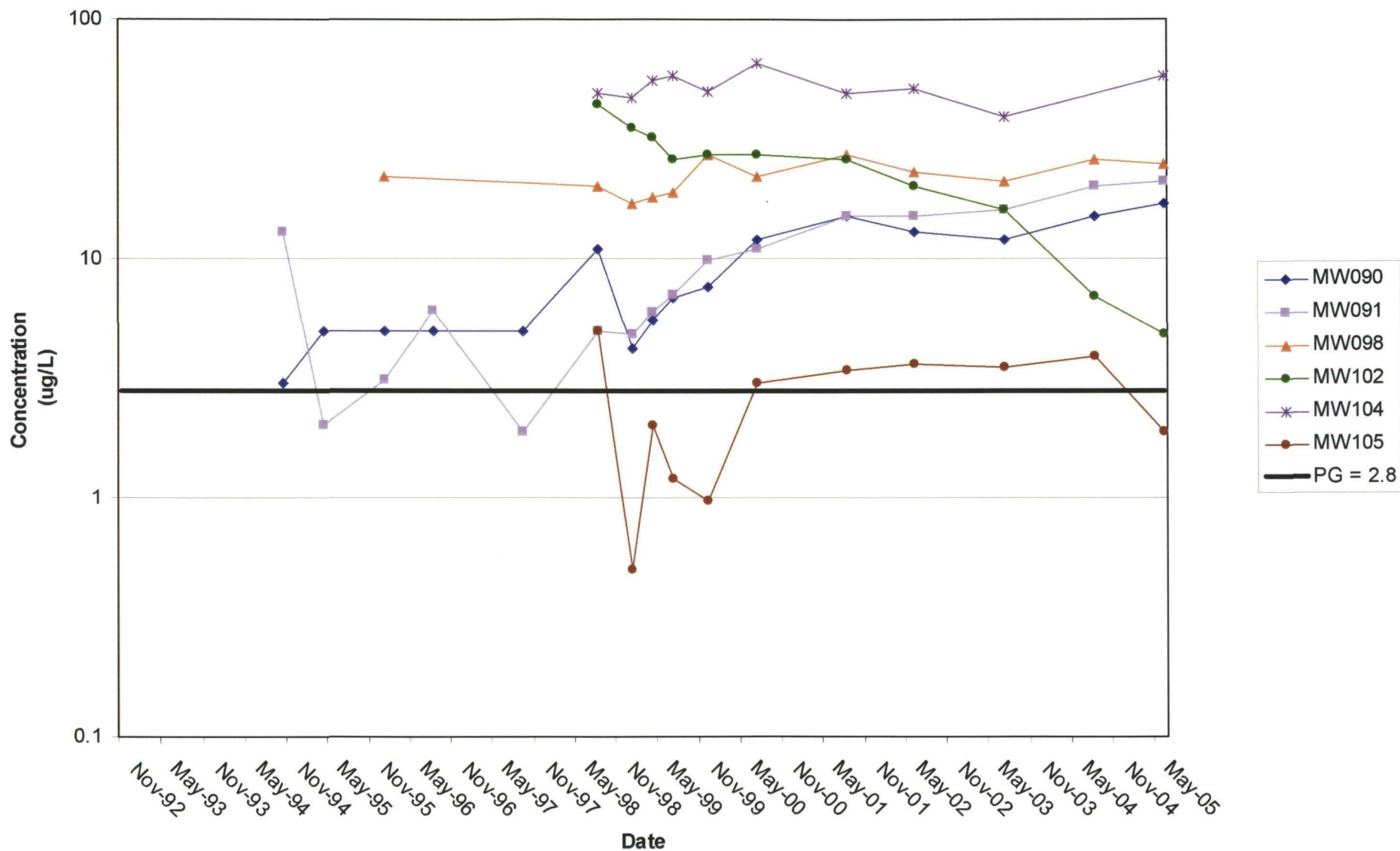
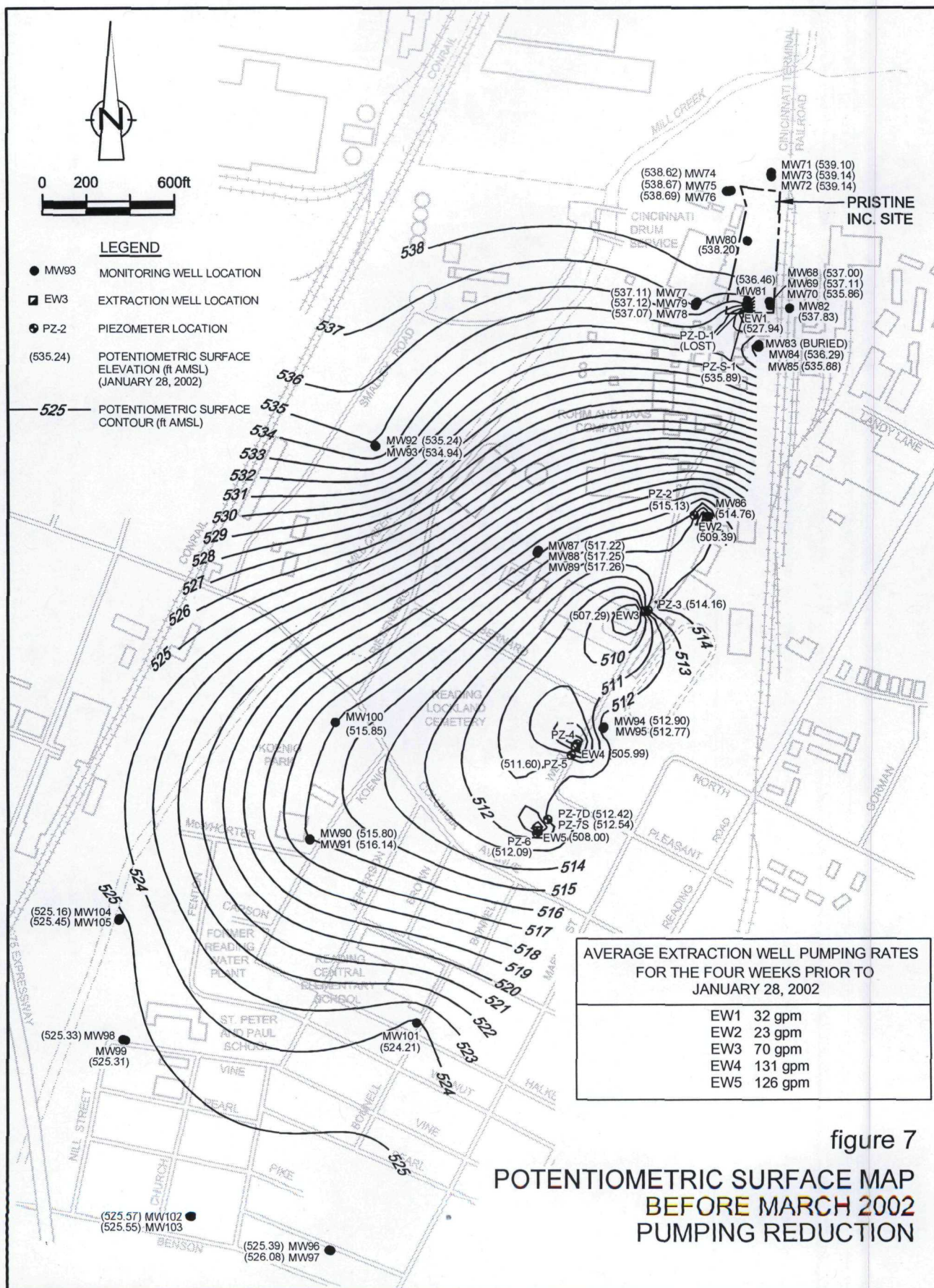


figure 6

TCE LOWER AQUIFER SAMPLING RESULTS OVER TIME FOR SELECTED WELLS



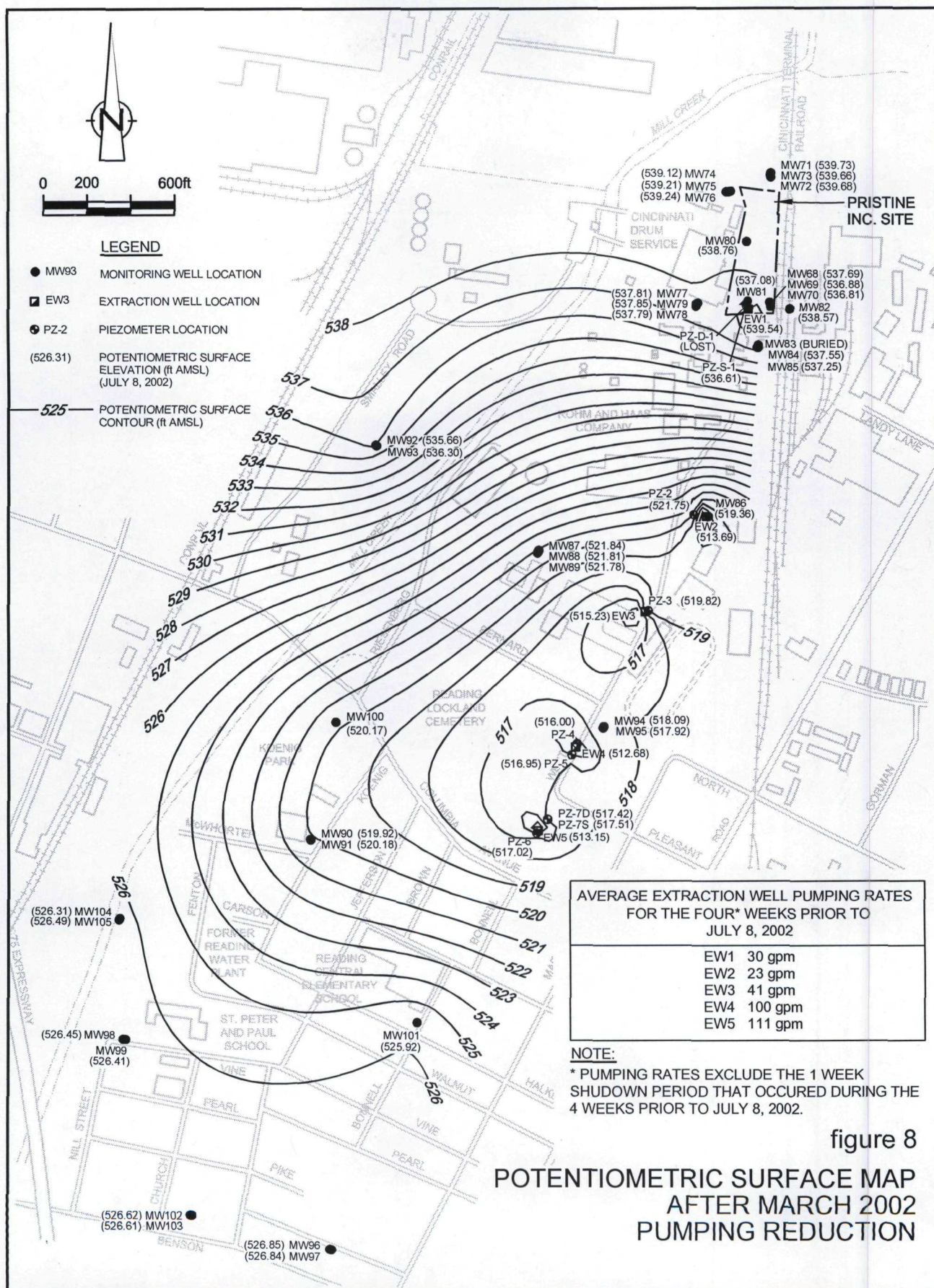


figure 8
POTENTIOMETRIC SURFACE MAP
AFTER MARCH 2002
PUMPING REDUCTION

